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3rd Adams on Ectropium; artificial
Pupil & Cataract with
3 plates, (2 col:d) Lond 1812

PRACTICAL OBSERVATIONS ON VARIOUS NOVEL MODES OF *Operating on Cataract,* AND OF FORMING AN ARTIFICIAL PUPIL.

BY

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TO

JAMES JEFFRAY, Esq. M. D.

PROFESSOR OF ANATOMY AND SURGERY

IN THE

UNIVERSITY OF GLASGOW,

&c. &c.

THESE OBSERVATIONS

ARE INSCRIBED,

AS A MARK OF RESPECT AND ESTEEM,

BY

HIS MUCH OBLIGED

AND GRATEFUL PUPIL,

ROBERT MUTER.

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PREFACE.

THESE observations on cataract and artificial pupil would not have been at present offered to the public but on account of a late ingenious publication* by Mr. GIBSON, of Manchester. My want of cases operated on, according to the mode now proposed, having hitherto prevented me from publishing opinions unsupported by what is generally conceived to be the true criterion of Surgical as well as Medical Practice. However novel the mode of operating, there is no deviation from principles already acknowledged by authors of the most distinguished abilities, and attended to by the most skilful operators. Even in regard to the mode itself, a close investigation of the practice of present and former oculists will discover a greater coincidence than at first may appear. The intention is to produce an uniform mode of operating on cataract, and in forming the artificial pupil, to give as little disturbance as possible to the structure and natural situation of the parts of the eye. It is evident a mode so comprehensive must be susceptible of being varied according to the diversity of circumstances. This has been attended to. And while we would prefer a safe mode of operating, the grand object must be the restoration of vision.

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* Practical Observations on the formation of an artificial pupil, &c, &c.

The chief cause to which I would attribute the occasional failure of extraction, owes its origin to that in which others may conceive its excellence to consist. One incision of the cornea knife, guided according to the dexterity of the operator, either removes the opaque lens from the eye, and restores the patient to sight, or irremediably consigns him to perpetual darkness. Simplicity is the ornament of every operation: ingenuity of design however ought never to give way to dexterity of execution.

It has been with me an established principle, that a difficult operation ought never to be performed in preference to one more simple, if the last might equally in the end succeed: and the more so, if it might also form a stage of the first, the delay thereby occasioned not necessarily increasing the difficulty, or rendering the success more dubious.

Mr. Gibson illustrates the propriety of his practice, by adducing cases suitable and exceedingly fortunate in their issue. His mode of operating occasionally differs from that which I would recommend. His opinions likewise differ from those which I entertain. But, upon the whole, I conceive there is considerable coincidence of our principles, and parity in our design.

I have, for a long time, entertained opinions which led to a practice differing widely from that generally adopted. Nor has this chiefly arisen from theory. At an early period of my medical studies, I had frequent opportunities of witnessing the common operations on cataract, and their consequences. Much more seemed to be done than was necessary: while the delicate structure of the eye, and situation of its parts, were too little attended to. Not only so, but in our best authors sometimes may be traced opinions not altogether consistent with the practice they recommend. While they confess that nature seems to be possessed of greater resources within herself than they were aware of, if properly assisted to remove the opaque lens and restore vision; they despise her even as an auxiliary, and wholly trust to their own operations.

Formerly even oculists of great eminence,* not only maintained that the lens denuded of its capsule, and lodged in the vitreous humor, remained undissolved and undiminished in size, but they said the same in regard to its being removed to the anterior chamber of the aqueous humor.

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* Baron de Wenzel on extraction of the cataract.

More lately however the solvent power of the aqueous humor, in regard to the lens, has been generally acknowledged, and operators of the first abilities,* have avowed that the aqueous humor has, in some cases, done more to destroy the cataract and restore transparency to the eye than their operations.

One thing too commonly had recourse to in operations on the eye, is the untimely and unnecessary evacuation of the aqueous humor. The quiescent state of the parts of the eye is not maintained by adhesion, but by equipressure; the density of the coats resisting the pressure of the muscles on the eye-ball. No sooner is this resistance removed by the incision or puncture of the cornea,

* Professor Scarpa and Mr. Hey.

than the aqueous humor is evacuated, and the equipressure destroyed.

This then is the line of distinction between the practice here recommended and that commonly adopted: to dissolve the opaque lens by freely admitting the aqueous humor in those cases where it can be done safely, and without causing too much delay. Where this cannot be done with propriety, or the speedy removal of the cataract is preferred, that operation conceived to be the most simple, and followed by the mildest symptoms, is chosen, and due care taken that the aqueous humor be not too precipitately evacuated.

In attempting to form the artificial pupil, I conceive it frequently conduces much to the operations being successfully performed, that the aqueous humor be not evacuated, and have endeavored to show how this may be effected.

One thing common to all these operations is the puncture of the cornea. The profession are now aware that this is not so frequently followed by inflammation as was formerly believed, nor to that degree.

It will afford me sincere pleasure, if the following observations are conceived by my medical brethern to be in any degree conducive to the successful treatment of cataract, or contracted pupil.

PRACTICAL
OBSERVATIONS.

SECTION I.

On the opaque lens, its color, various consistence, and symptoms.

IF Anatomists are at a loss to understand the œconomy of nature in the transparent membranes and humors of the eye, in a state of health, much more so are they at a loss in a state of desease. And after all the endless disputes concerning cataract, the phisiology and morbid anatomy, not only of the lens, but of the other transparent humors and membranes, remain a desideratum.

In the mean time the situation of cataract has been completely ascertained. The crystaline humor has been commonly observed to become opaque first in its centre. Sometimes the opacity spreading rapidly, at other times diffusing itself in a slow imperceptible manner, sometimes in a diseased state the lens adheres to the capsule, and blood vessels have been found shooting through the capsule upon it.

The color of the opaque lens frequently undergoes a considerable change, being in some cases dark, in others pearly white. This variety in its color has been considered of the more importance, as indicating the degree of change taken place in its consistence, and in some measure regulating our practice. It has, however, proved an uncertain criterion, and, before an operation, its consistence cannot frequently be known.

The terms hard cataract, soft cataract, milky cataract, and like others have been thought requisite to express the consistence of the lens in a state of opacity.

The most certain and early internal symptom* of incipient cataract, is a settled mist, covering objects, and confusing those that are minute. The appearance of threads, flies, cobwebs, black specks, and bars, and other fantastic figures dancing before the eyes, rather indicate extreme sensibility in the retina, than incipient opacity in the lens. All these symptoms, or any other, however, ought not, on any account, to induce us to operate, unless we plainly see the opaque lens, or its capsule, through the pupil of the eye.

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* Mr. Ware on the cataract.

Besides, it is an established fact, that there are certain diseased states of the eye sometimes to be met with which are hopeless; should cataract in those instances exist, no operation could be of any service, and the disease should not be aggravated.

SECTION II.

On the instruments used in performing the following operations.

ONE or more of the following instruments may occasionally be used according to circumstances.

1. A flat needle, something resembling a couching needle, with a cutting edge near its point.

2. A very small hook, with its point very much incurvated.

3. The curette or little spoon.

4. A pair of very small forceps, which shut with a spring, and have only one long handle, the other terminating over the spring by which they are closed, upon this last pressure is to be applied by the forefinger of the hand in which they are held, in order to their being opened.

5. The speculum oculi of Pellier.

6. An instrument resembling the usual cornea knife, having a couching needle added to

its point, the blade, which is nearly of the ordinary dimensions, slides forwards and backwards on the needle. The needle having punctured the cornea, and laid open the capsule of the lens, traverses the anterior chamber and appears on the opposite side at the same distance from the sclerotica as it was entered, and fixes the eye during the time the operator moves the blade forwards, and completes the incision of the cornea. Of this instrument more particular notice will be hereafter taken.

SECTION III.

On the mode of laying open the capsule of the lens, through a puncture in the cornea.

THE opacity of the lens indicating the propriety of an operation, and the state of the eye considered favorable to its success; the patient is to be seated in a low chair, before a light not too bright and active: the eye not to be immediately operated on, covered by a compress retained by a bandage. The patient's head is then to be placed obliquely to a window, so that the eye to be operated on may be inclined towards the outer angle of the orbit.

The operator being conveniently seated for operating, is to place the fore and middle fingers of the left hand upon the tunica conjunctiva, just below, and a little on the inside of the cornea. At the same time, the assistant who supports the head, is to apply one, or, if the eye projects sufficiently, two of his fingers upon the conjunctiva a little on the inside and above the cornea. The fingers of the operator and assistant thus opposed to each other, will fix the eye and prevent the lids from closing. These preparatory steps are here introduced in order to prevent their repetition, being almost equally applicable to this and all the following operations. They are quoted nearly verbatim from Mr. Ware's translation of Baron de Wenzel's work on extraction of the cataract, and from Mr. Ware's notes.

It may also be observed, the speculum oculi of Pellier is at present used, and the operator has but little cause to fear any injury from the slight pressure produced by it on the eye-ball, especially so long as the aqueous humor is not evacuated. The following is the mode of performing the operation.

The point of the needle is to pierce the cornea in the line of its transverse diameter, immediately anterior to its connection with the sclerotica. It is then to be guided slowly forwards, with its flat side parallel to the iris, until opposite the pupil. The point being then turned backwards, punctures the capsule of the lens near the border of the pupil on the same side it entered: and passing a little way behind the capsule, not so far as to endanger the opposite side of the pupil being cut, its cutting edge is turned forwards towards the capsule, and its point elevated. The cutting edge of the needle will divide that portion of the capsule between the point of the needle and where it first entered. Should it be thought proper to attempt to break down the lens, it would be more safe to withdraw this needle and introduce one having a small curvature towards its point, and without a cutting edge. The needle should then be withdrawn, and in doing so the aqueous humor might be allowed to escape. What degree of success may be expected from this operation will best appear by the following excerpts from the works of Professor Scarpa, and Mr. Hey of Leeds.

" But if the operator should meet with a
" fluid cataract, the milky for instance, which
" is not an uncommon occurrence.

" The effusion of the milky fluid into the
" chambers of the aqueous humor disappears in
" a few days after the operation, and permits
" the pupil, and the whole of the eye, to re-
" sume their former natural brightness.

" Should the surgeon meet with a soft or
" cheesy cataract, the anterior convexity of
" the capsule should be lacerated as much as
" possible opposite the pupil, so that the open-
" ing may equal the diameter of the pupil in
" its ordinary dilatation. And with respest to
" the pulpy substance of the cataract, which

" in such cases remains behind, partly diffused " in the aqueous humor, and partly swimming " beyond the pupil, all that is necessary is to " divide the most tenacious parts of that substance, that they may be the more easily " dissolved in the aqueous humor, and to push " those molleculæ of the caseous substance of " the crystaline, which cannot be sufficiently " divided through the pupil into the anterior " chamber of the aqueous humor, in order " that they may not be carried opposite the " pupil, but being situated at the bottom of " the anterior chamber, may be gradually dissolved and absorbed without obstructing the " sight.——*Professor Scarpa.*

" Though I do not think it adviseable to " persist in pressing an entire cataract into the " anterior chamber, when the advance of the " cataract causes a large dilatation of the pupil; " yet after the needle has wounded the capsule, " a firm cataract, or at least its nucleus, will " sometimes slip through the pupil without " the design of the operator. This has been " considered by some authors as a disagreeable " circumstance, and has been ranked among the " objections to the operation of couching. On " the contrary, it ought to be considered as a " favorable event if the opaque portion is not " large, since it will then generally dissolve " in the aqueous humor, and finally disappear

" without any injury to the eye. This, at least, " has been the event in every case of the " kind which I have seen. I have, six or " seven times, seen an opaque nucleus fall " into the anterior chamber of the eye, and " very frequently small opaque portions; but " the sight in all these cases was restored by " the dissolution of the cataract.

" If the opaque portion be large, it may be " the most prudent method to extract it by a " division of the cornea; though, in some of " the cases to which I allude, the opaque " nucleus was of such a size as to hide the " pupil from view, till the dissolution began to " take place.

" Hitherto the cataract has been considered " as firm, and capable of bearing the pressure " of the needle; but, in the greater number " of cases which have fallen under my care, " the cataracts have been found so soft as to " permit the needle to pass through them in " all directions. In this state of the disease " I do nothing more than break down the " texture of the cataract, and endeavour to " puncture or tear off a portion of the capsule, " that the aqueous humor may flow in upon " the broken cataract. In doing this, it is " common to see some fragments of the cataract " fall through the pupil into the anterior

" chamber of the eye. I am always glad to " see this take place, as I then know that " there is a passage opened for the admission " of the aqueous humor; and, that those opaque " fragments which have passed through the " pupil, will soon disappear.

" Sometimes the cataract is so uniformly " soft that the passage of the needle through " it makes no alteration in its appearance. " This species of cataract was considered by " Mr. Samuel Sharp and Mr. Warner, as incurable. In this opinion these excellent " authors were certainly under a mistake; for " I find that although an uniform softness of " the cataract may require a more frequent " repetition of the operation, it affords no permanent impediment to the cure. Upon repeating the operation in such cases, I have " often found that the first operation had " produced more effect, than at the time of " operating it appeared to produce. The cataract " upon a subsequent operation, appears more " broken and irregularly opaque. Some portions " may now be removed which before appeared " immoveable; some fall into the anterior " chamber, and the remainder becomes gradually dissolved in its original situation.

" A soft cataract has, in some respects, the " advantage over the hard one, as the former

" is less apt to adhere to the iris, and con-
" sequently there is less risk of deranging the
" ciliary processes, or their investing membrana
" nigra, by breaking down a soft cataract,
" than by removing a hard one."—*Mr. Hey.*

Nothing can be more decisive than the manner in which both these gentlemen give their opinions. Nor could any number of experiments, made on purpose, more satisfactorily prove, that the aqueous humor can dissolve the lens when denuded of its capsule, or broken down by the needle, than those cases related in their works.*

Should the operator discover the opaque lens to be of a hard consistence, from the resistance met with by the point of the needle, it would not, by any means, be proper to persist in repeated attempts to break it down. In that case it is enough to have laid open the capsule and freely admitted the aqueous humor. Afterwards, when the cataract has become more soft, and partially dissolved, it will then be necessary to divide the softer parts; and if the hard nucleus is not too large, to facilitate its protrusion into the anterior chamber. But, should even a large nucleus escape into the anterior chamber, and produce much irritation by distending it, and keeping up a continued pressure upon the iris, the occasional evacuation of the aqueous humor, by a puncture in the cornea, would remove the distention, and probably allay the irritation.

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* See Mr. Pott, &c. &c.

In cases of soft cataract, the operator may greatly accelerate the solution of the opaque lens, by breaking it down with the point of the needle, and facilitating the escape of the fragments into the anterior chamber. In doing this care must be taken that the margin of the iris be not wounded, nor the posterior capsule of the lens lacerated.

It appears from Mr. Wardrop's observations on the evacution of the aqueous humor, and from Mr. Gibson's late publication, that little inflammation follows the puncture of the cornea. This fact is of the highest importance in regard to this operation, as its repetition can only on this account be persisted in.

Mr. Gibson observes, "with respect to the "general result of this mode of operating*, "my experience has been, that in two or three "days the eye is in a fit state to be exposed "to the light. The puncture of the cornea "seldom produces more than the slightest

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* Puncturing the cornea.

" blush of inflammation, and the aqueous " humor is regenerated in the course of an " hour or two.*

We might, *a priori*, have concluded on fair principles, that the inflammation excited by a puncture of the cornea, could not equal that excited by the operation of couching, from the very different degree of sensibility of the parts wounded in these operations. The escape too of the aqueous humor, in puncturing the cornea, takes off the tension of the parts, alleviates the pain, and prevents inflammation. It is well however, that facts are not wanting which bring with them more conviction than any analytical deduction however fairly drawn; and unless the delay occasioned by this mode of operating be objected to, no cause of apprehension need be entertained on account of its repetition.

Mr. Ware relates a case where the capsule of crystaline lens was largely punctured on purpose to admit the aqueous humor; the event of which was unfortunate. We are not informed whether the eye thus operated on, was previously in a healthy or diseased state; but the fact is mentioned as a proof that the lens is dissolved by being placed in the anterior chamber of the aqueous humor*.

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* See also Baron de Wenzel.

At all events, in those cases where a large nucleus of hard consistence is removed into the anterior chamber, the eye being in a state of great irritability, the cornea should immediately be divided, and the nucleus extracted.

Even in soft cataract, should the patient be of a weak, sickly, irritable habit, it would not be advisable to run any risque of injuring an already impaired constitution, in order to obtain the absorption of the opaque lens. But in a healthy patient, the eye and neighbouring parts, being free of any local affection, I should not expect a single untoward symptom to follow the occasional introduction of a needle through the cornea, in order to render the absorption more speedy, by breaking down the large pulpy fragments of the lens, and assisting their protrusion into the anterior chamber, if the aqueous humor was permitted to escape on withdrawing the needle.

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* "I have seen (says he) the anterior portion of a capsule, in the case of a cataract of many months continuance, largely punctured by an instrument introduced through the cornea for this purpose, in order to bring the aqueous humor into contact with the opaque crystaline; and in this case, at the end of some weeks, the cataract removed out of its capsule and came forward into the anterior chamber, in which it floated a considerable time, gradually decreasing in size, until at length it totally disappeared. During the time that the opaque crystaline floated in the anterior chamber, the eye was constantly in a state of irritation; in consequence of which the patient was repeatedly requested to allow the opaque body to be extracted, but he always objected to it. The pupil remained large and clear after the cataract disappeared, but the irritation, which its pressure on the iris kept up, continued so long, that it produced a true gutta serena, which totally destroyed vision. Some months after this a cataract was completely formed in the opposite eye, which being extracted in the usual manner, the sight was thereby restored."

Since that period Mr. Hey, Professor Scarpa, and others, have met with better success in cases not materially different, as has already been shewn. And indeed I conceive the cataract which followed in the other eye, might as well be ascribed to the irritation kept up by the nucleus on the iris, as the gutta serena, which is here said to have taken place on that account.

Two advantages might be expected to result from the occasional evacuation of the aqueous humor. The smaller loose flocculœ would also be evacuated, and the distention of the coats of the eye being lessened, inflammation would not be so likely to follow. A thin flat needle, that might be said to make a small incision rather than a puncture, should, by all means, be used in this operation.

SECTION IV.

On the extraction of a soft cataract, through a puncture or small incision of the cornea.

ALTHOUGH I venture not, on my own experience, to affirm that which has already been brought forward in the last section, I do most certainly believe that the operation there described, being once or twice repeated, will be found to succeed so frequently in causing the solution and absorption of the soft lens, as to render its extraction very seldom necessary. We shall, however, here consider the former operation of puncturing the cornea, and laying open the capsule, as preparatory to the mode of operating now to be described.

The cataract, if formerly of a hard consistence, having been freely exposed to the aqueous humor, will nearly approach to the pulpy state of a soft cataract. When this is the case may be known from the unequal, loose, flocculent appearance assumed by its surface, and little shreds of its substance which begin to swim about in the anterior chamber among the aqueous humor.

In soft cataract, Mr. Gibson observes, "Generally speaking, as soon as the irritation "produced by the operation of couching has "subsided, the cataract will be in a proper "condition to be removed. When very little "irritation has been produced by the needle, "the puncture of the cornea may be per-"formed in two or three weeks." It is a fact, the proof of which we are partly possessed of by the experience of former surgeons, and which future practice is about to complete; that the aqueous humor acts as a quicker solvent on the lens, and causes its absorption sooner than has till lately been believed.

It may be proper to allow fully the time here specified, even in cases of soft cataract. Whereas, in those cases where the cataract is of a hard consistence, double that time may be requisite to reduce it to a soft pulpy substance. In either case the operation being resolved on, may be performed as follows.

The patient and operator being conveniently seated, the preparatory arrangements made; the operator taking the cornea knife of the usual size, pierces the cornea at its external angle, a little above the line of its transverse diameter, immediately before its junction with the sclerotica. And if the opening in the capsule of the lens, previously made, is not sufficiently large to permit the escape of the fragments of the lens, he now enlarges it with the point of the knife. The knife is then to be withdrawn, and all pressure removed from the eye. The curette is now to be introduced through the incision in the cornea, and opening in the capsule of the lens, in order to expedite the protrusion of the fragments. Its side being pressed gently upon the iris, will push it backwards, and allow the escape of the other fragments along with the remainder of the aqueous humor. The small hook being introduced, and used in a similar manner, will also be found particularly useful. Too much time should not be employed, nor too many repeated attempts made to remove every little portion of the lens, as inflammation may thereby be excited. Those fragments which remain will soon be dissolved by the aqueous humor, and totally disappear. Besides, the operation should rather be had recourse to a second time, which will very seldom, if ever, be necessary.

In a former section it was observed, in a quotation from Professor Scarpa, that in a case of milky cataract, the milky fluid which was effused into the chamber of the eye, on lacerating the anterior capsule of the crystaline, disappeared in a few days. Its disappearance would be still more speedy in the preparatory operation, as most of it would be evacuated along with the aqueous humour, through the puncture in the cornea. And unless a nucleus remained, this operation could not be necessary, as vision would be almost instantaneously restored.

By this mode of performing the operation, the posterior capsule of the lens, and membrana vitrea remain uninjured, consequently the vitreous humor cannot escape.

Hence appears the propriety while endeavoring to puncture the capsule of the lens, in the preparatory operation, that too much pressure backwards be not applied, lest its posterior portion be ruptured, and the lens partially depressed. Should this unfortunately take place, the lens would be thereby in a great measure withdrawn from the aqueous humor, and this operation would become more difficult to perform, and more dubious in its success. Indeed I do not hesitate to say that even an expert operator could not always prevent the escape of part of the vitreous humor under such adverse circumstances. Mr. Gibson, however, adopts couching as his preparatory operation, consequently the posterior portion of the capsule and membrana vitrea must be lacerated. But notwithstanding his dexterity enabled him to perform the operation with perfect success, I can see no good reason why his manner of operating should be imitated.*

" Every surgeon " says he, " who is ac-
" customed to the operation of couching, cannot
" well fail to be aware that he has a soft
" cataract to act upon when he has felt the
" slight resistance which it gives to the couch-
" ing needle, and observes how little change,
" in many cases, the instrument makes in its
" appearance. In these cases where the re-
" moval of the cataract from the axis of vision
" cannot be affected, on account of its softness, it
" should be the aim of the operator to rupture,
" most freely, the anterior part of the capsule,
" and to break down the substance of the cataract,
" by passing the couching needle cautiously
" through it in different directions, that the
" aqueous humor may more readily act upon
" it and reduce it to a pulpy state. When
" this has been effected, and the eye has
" perfectly recovered from the operation, the
" surface of the cataract will probably have

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* It is but doing him justice, however, to observe, that when extraction can be performed in the usual mode, he greatly prefers it, and only recommends this mode of operating in those cases of soft cataract, where couching has failed to remove the opaque lens from the axis of vision, or in order to prevent its frequent repetition.

" put on a flocculent appearance, and be fit
" for extraction."

His mode of performing the puncture, or small incision of the cornea, is the same as I have formerly proposed; I therefore pass it over to notice his observations on the escape of the the vitreous humor. " A circumstance which
" might be apprehended during the extraction
" of the soft cataract through a puncture in
" the cornea, is the escape of part of the
" vitreous humor. As the success of this
" operation much depends upon the free lacera-
" tion of the anterior part of the capsule of
" the crystaline lens; and as its posterior part
" must have been previously lacerated by the
" couching needle, in breaking down the sub-
" stance of the cataract, it might be imagined
" that there would be so little impediment to
" the escape of the vitreous humor towards
" the latter part of the operation, that a con-
" siderable quantity would be lost. This, how-
" ever, has in no instance occurred to me in
" performing this operation. Such an accident
" indeed, is scarcely possible; for as soon as
" the aqueous humor has been evacuated, the
" iris falls into contact with the internal surface
" of the cornea, and forms a kind of valve,
" which completely closes the puncture, so that
" there is no passage for the removal of the
" soft cataract, until the curette is introduced.

“ The point of this instrument, also, must “ occasionally be pressed a little backwards, “ that a more free exit may be allowed for the “ fragments. As soon as the pupil appears “ clear, and the vitreous humor is seen, the “ curette is to be withdrawn so as to obviate “ any risque of such a loss. If, indeed, the “ strenuous advocates for the unconditional em- “ ployment of the couching needle did not “ appear to have so unnecessary a dread of “ this accident, as to anticipate its occurrence “ even in this operation; I should have been “ spared the pains of obviating so groundless “ an apprehension.”

I readily make all due concessions to this Gentleman; I am convinced of his dexterity in operating, and give credit to his success: but, although I am no advocate for the operation of couching, yet I fear the evacuation of the vitreous humor, equal to the most strenuous of its supporters. I am well aware that a considerable portion of the vitreous humor has escaped in the operation of extraction, and total privation of sight has not followed, yet I consider it a circumstance most carefully to be guarded against. In those cases where the operation of couching has failed to remove the soft cataract from the axis of vision, the very nature of the operation renders the laceration of the posterior portion of the capsule and membrana vitrea inevitable; nor does the evil stop here; the natural structure of the vitreous humor suffers considerable derangement. What then, upon the introduction of the curette, prevents the escape of the vitreous humor thus broken and deranged.

It will appear evident, upon the slightest consideration, that the aqueous humor, the broken substance of the lens, and the vitreous humor, must, of necessity, be partly blended together. Although, under these circumstances, the soft cataract may be successfully extracted, yet I would recommend to the ordinary operator to pay due attention to what has been commonly the consequence of a spasmodic action of the muscles upon like occasions, in the usual mode of extraction; and rather than suffer too great a loss of the vitreous humor, to permit part of the cataract to remain behind, to be dissolved by the aqueous humor. Where couching has not already been performed, I must deprecate it as preparatory to this operation. The injudicious use likewise of the hook or curette, where the posterior portion of the capsule has not been previously lacerated, may cause its rupture, and be productive of the like consequences.

The sensibility of the iris, and danger of producing the contracted pupil, by its being irritated, may be thought an objection to the use of the small hook or curette. These instruments have been long used in extraction by those who were afraid to leave a single fragment of the cataract behind; nor have we frequently heard of any ill consequences from their use, when in the hands of a skilful operator. Mr. Gibson says, "In many instances "no trace of inflammation, or of any operation, "could be seen on the eye the next day; "nor has the iris ever been injured or irritated "in the slightest degree by the use of the "curette."

Some anatomists have considered the sensibility of the iris to be of a particular kind, and not to be affected by the immediate application of any ordinary stimulus. Notwithstanding the iris is abundantly supplied with nerves, I do conceive it to be only capable of being sensibly affected in a secondary way through the medium of the sensorium, nor do I know of a single direct proof to the contrary. But this rather relates to the muscularity of the iris, than to its susceptibility of inflammation.

To conclude this section, however much an unnecessary fear of doing harm should be guarded against in the mind of the operator, as of necessity causing him to embrace a trifling mode of operating, at the same time as the solvent power of the aqueous humor is conceived to be of much importance in this mode of extraction, the too free and unguarded use of instruments is very reprehensible.

SECTION V.

On a new mode of puncturing the capsule of the lens, and fixing the eye in the operation of extraction.

VARIOUS modes of puncturing the capsule have been practised by oculists. Baron de Wenzel used to puncture the capsule with the same instrument, and at the same time that he performed the section of the cornea. In this he was for some time unsuccessfully imitated. Lately this mode has been laid aside, being rather considered a display of the operator's dexterity, than being in any way useful. It is now common to complete the section of the cornea, and then to puncture the capsule by introducing a needle through the incision.

It appears, from the cases related by the Baron*, that he not unfrequently suffered the aqueous humor to escape before the incision of the cornea was completed. The cause of this has been attributed to his mode of operating. However, this excellent operator, on perceiving the iris become entangled by the edge of the knife, immediately employed gentle frictions with the point of the finger on the cornea, and disengaged it. By this means he was enabled to replace the iris, and complete the incision of the cornea with safety.

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* Baron de Wenzel, Jun.

I am of opinion that good reason may be shewn why it is proper to puncture the capsule of the lens, previous to our attempting the incision of the cornea. Nor do I view what are called the subsequent parts of the operation, in the most auspicious light. " It must be " obvious to every one," says Mr. Ware, " that " if the incision of the cornea, through which " the cataract is to be extracted, be not " somewhat larger than the cataract itself, a " degree of violence will be required to bring " the cataract through it, and in consequence " of this, if the cataract be not altered in its " figure, the wound in the cornea will be forcibly " dilated, and the edge of the iris, which " forms the rim of the pupil, be compressed " between the cornea and the cataract, and be " liable either to have some of its fibres ruptured, or be otherwise so much injured as to " excite a considerable degree of inflammation, " and ultimately to hazard a contraction or a " closure of the pupil." True, a large incision of the cornea will obviate these consequences, equally so will the diminishing the size of the cataract, by puncturing the capsule and freely admitting the aqueous humor to the lens, sometime previous to the performing the section of the cornea. But the iris sometimes suffers considerable injury from a large cataract passing through the pupil, when the incision of the cornea has been made of sufficient extent. It also frequently happens that the figure of the pupil, after the operation of extraction assumes an irregular shape, the iris acquires a tremulous motion, and very frequently in some measure loses the power of contraction and expansion. All these effects may be traced to the same origin, that is, an injury sustained by the iris, either during the protrusion of a large cataract through the pupil, or from the removal of adhesions where the capsule adheres to the iris. Baron de Wenzel, in his seventeenth case, says, " From this case we may collect how " essential it always is to make a large incision " through the cornea, in order to give the " pupil sufficient room to dilate with ease. " There is no reason, under these circumstances, " to apprehend a staphyloma as has been " supposed by some authors. I have observed, " on the contrary, that the wound has healed " with less difficulty, and staphyloma has been " less frequent, when the section of the cornea " has been thus large, than when it has been " small." The observation is, in some measure, just, but the cicatrix in the cornea does not take place sooner because the incision is large, but from its proportion to the cataract. For when the incision of the cornea is not in proportion to the size of the cataract, it will be forcibly dilated, and its lips bruised, consequently the healing process cannot take place so quickly. But we have been told that the pupil in this case was contracted, and not a word was said of the incision in the cornea being too small. The truth is, no incision of the cornea, however large, can sufficiently cause the expansion of a contracted pupil to permit the protrusion of a hard cataract of a large size. Nor does it appear that he profited much by his experience; as he says, " The " following year I performed a like operation " upon the other eye, and under much the " same circumstances." Does it not therefore seem evident to be the more direct mode of diminishing the difficulty, to reduce the size of the cataract, in contracted pupil, rather than to increase the incision of the cornea.

Another reason why I conceive that the puncture of the capsule should be performed previous to the section of the cornea, is the risk of deranging the loose divided flap in the subsequent introduction of instruments. Mr. Ware observes " Whoever has been much accustomed " to the operation of extracting the cataract, " must have observed that this takes place not " unfrequently in performing those parts of

" the operation which are subsequent to the " incision of the cornea." He also informs us, " I extracted a cataract from a man whose " eye was so extremely irritable, that after the " incision in the cornea was completed, it was " in a constant rolling motion, not only on " every attempt to touch it with an instrument, " but even on separating the lids to look at it." Similar instances occurred to Baron de Wenzel, who says, that in one case he afterwards found more difficulty in introducing an instrument to puncture the capsule of the crystaline, than in all the other parts of the operation.

It must appear evident that in this irritable state of the eye there is considerable risk, not only of corrugating and deranging the loose flap of the cornea, but of puncturing the capsule improperly, and pushing the instrument through its posterior portion, when the escape of part of the vitreous humor would almost be unavoidable. Perhaps the danger of puncturing the posterior portion of the capsule, may not be much greater as a subsequent than as a preparatory part of the operation; yet I conceive the irritability of the eye to be increased from the incision of the cornea, and the evacuation of the aqueous humor. At all events, as a milky cataract is not an uncommon occurrence, the incision of the cornea may not be necessary, as the milky fluid would escape along with the aqueous humor through the puncture. The capsule having been previously punctured, should it be necessary to finish the operation by the usual incision of the cornea, the eyelids should be immediately closed; by this means the vitreous humor will be prevented from escaping. Very different is the case when the capsule is subsequently punctured, the incision of the cornea being completed, and the equipressure of the eyeball destroyed, by the evacuation of the aqueous humor, the eye must still be kept open till the capsule is punctured, or the eyelids must be again purposely opened.

" There is a circumstance in the operation
" of extracting the cataract which I have seen
" little attended to, and yet it is sufficiently
" evident. When the cornea has been cut,
" operators, disappointed in not finding the
" cataract protruded, keep the eye staring in
" the light, and press the ball of the eye;
" but while the eye is thus exposed to the
" excitement of the light, the pupil is con-
" tracted, and the lens propelled by the action
" of the muscles, and still more by the pressure
" made on the eyeball, is in danger of bursting
" through and tearing the iris. The best opera-
" tors have been in the custom of shutting

" the eyelids the instant the incision was made " in the cornea; by this means the eye is for " a time supported in some degree during the " violent spasm of the recti muscles, and the " iris being allowed to dilate, the lens is pro" truded into the anterior chamber of the " aqueous humor, through the pupil, and is " ready to slip from under the cut cornea, " when the eye-lids are again opened. By this " means, if the incision of the cornea be of " the proper extent, the lens is not extracted, " but is protruded by the action of the muscles " of the eye."—*Bell's Anatomy.*

I know of no mode of operating, excepting that of Baron de Wenzel, and that now proposed, in which it is possible that the lens could be protruded in the manner here mentioned by Mr. Bell, as it is commonly necessary to puncture the capsule before the lens can escape from the eye.

Another subsequent part of the operation is the introduction of the curette, in order to remove those portions of the lens which remain behind. This might be rendered unnecessary by the previous puncture of the capsule, as the aqueous humor would then dissolve the soft exterior lamellæ of the crystaline, and the denser part of its centre would readily escape through the pupil.

"It should be remembered, that in cases "the most favorable, when the incision through "the cornea is made of its proper size, and "the degree of pressure applied to the cataract "is adjusted in the best manner possible, the "cataract rarely comes out of the eye at once "in a state so complete as not to leave some "portions behind, which require to be afterwards "extracted. Sometimes when the cataract "is soft, a considerable portion of it is thus "left, and at other times when its consistence "has been firm, I have found it broken into "two parts, nearly equal in size, one of which "only has come through first, and the other "has required afterwards to be extracted by "means of the curette or little spoon. It has "occasionally been necessary to introduce this "instrument several times before the whole "opaque matter could be extracted, so as to "leave the pupil quite transparent. Great care "is required in conducting this part of the "operation, in order to hinder the posterior "part of the capsule of the crystaline from "being ruptured by the end of the instrument, "which accident would immediately open a "way for the discharge of the vitreous humor."—*Mr. Ware.*

Experience has shewn the propriety of not permitting any portion of the cataract to remain behind in extraction, as its discharge through the incision might prevent the formation of the cicatrix, and bring on staphyloma. And notwithstanding it has been formerly observed, that the aqueous humor would dissolve the fragments of the cataract which might remain after the operation of extraction through a puncture in the cornea, as in that case the puncture is frequently not visible the next day, and there could be no danger of staphyloma; very different is the case in this mode of operating. I therefore also on this account think it of importance that the capsule be punctured sometime previous to the incision of the cornea, that the aqueous humor may dissolve the soft exterior substance of the lens.

Much needless disputing has been maintained concerning the extent of the incision of the cornea. An incision containing nine sixteenths of the circumference of the cornea, has always caused some degree of dread to the inexperienced; whereas the skilful operator is aware that most of the ill consequences result wholly from the incisions being too small.

" Formerly, indeed, I was inclined to think
" it advisable to make the incision through
" the cornea smaller than is here mentioned, in
" order, with the greater certainty, to avoid
" wounding the iris; but then I always took
" care to enlarge the incision with a pair of

" curved blunt-pointed scissars, before any " attempt was made to extraet the cataract*." Mr. Ware has long ago relinquished this mode of operating, being able to make the incision sufficiently large with the cornea knife alone, and at the same time to do no injury to the iris. It is evident however, that a small incision is more easily accomplished than a large one, and with less risk of evacuating the aqueous humor and wounding the iris. It is true, in the usual mode of extracting the cataract, that staphyloma takes place more seldom from a large incision than a small one, and that the first heals soonest; the cause of this has already been shewn, and in every mode of operating there ought to be a just proportion between the cataract and the incision. But unless it be maintained for some mysterious reason, that an incision of nine sixteenths of the circumference of the cornea heals sooner, and is less apt to produce staphyloma than any other: an incision of six sixteenths will heal as soon, be as little apt to produce staphyloma, and will in every respect equally answer the purpose, the size of the cataract being proportionally diminished; nay, more so.

Is it therefore so desirable an object to accomplish at one complicated operation, what might more easily, and I believe more safely, and certainly be done at two? It is enough however to have proposed the puncture of the capsule of the crystaline previous to the section of the cornea, and if after experience shew it to be an improvement, I have no doubt of its being adopted.

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* Mr. Ware.

The preparatory operation of puncturing the capsule having been performed, and the cataract judged to be in a state fit for the operation, the other preparatory steps being also taken, the operator taking the usual cornea knife, pierces the cornea immediately anterior to its junction with the sclerotica, a little below the line of its transverse diameter. The blade of the knife is then to be guided before the iris in the usual manner, and its point to pierce the opposite side of the cornea from within, outwards, at the same distance from the sclerotica as it was entered, and at the same distance below the line of its transverse diameter. All pressure should now be removed from the eye, and the incision completed. Great care should be taken that the incision follow exactly the circle of the cornea, and at a very little distance from its margin. The eyelids should be immediately closed. The assistant first cautiously dropping the upper eyelid so as to cover the incision, then the operator removing the fingers of his left hand, suffers the lower eyelid to be closed also. The operator, after a little time, raising gently the upper eyelid, the lens, if not previously, is now protruded. A gentle friction, with the point of the finger on the fore part of the eyelids, is to be used, in order that if any fragment remained behind, it may be collected under the cornea and removed. Should any fragment still remain behind, so as to require the use of the curette, it certainly should be used, and the fragments extracted. The flap of the cornea should be carefully adjusted, and the eye examined, that the eyelashes or any other extraneous body may not remain to produce inflammation. The eyelids are to be again closed as formerly, and a compress properly adjusted over the eyes.

In this mode of operating, if the cornea knife be carried forward in a steady progressive manner, so that the point appear on the opposite side before the section is attempted downwards, there will be little or no danger of evacuating the aqueous humor, or wounding the iris. Before the point of the cornea knife appears on the opposite side, its cutting edge will have advanced downwards, much below the margin of the pupil, it cannot therefore become entangled with it, nor in danger of wounding it.

However absolutely necessary it may be, in the usual mode of operating, to puncture the cornea above the line of its transverse diameter, it is this very circumstance that puts the iris in danger. The point of the knife being carried above the centre of the pupil, must have advanced a considerable way before its cutting edge descends below its margin ; and should the aqueous humor be evacuated, the pupil will then assume an oval form, with its longest diameter downwards, the iris falling forwards like a valve, towards the incision of the cornea and edge of the knife.

Baron de Wenzel maintained that in cases of soft cataract, the incision in the cornea should not be less than the usual extent, in order to prevent a large portion of the pulpy substance from being left behind, which he conceived would either continue to be discharged, and prevent the formation of the cicatrix, or be the cause of secondary cataract. But it has been shewn from Mr. Ware, that some portion of the cataract remains behind, when the incision of the cornea is made of its proper size, and the degree of pressure applied to extract it, is adjusted in the best manner possible. And sometimes when the cataract is soft, a considerable portion of it is left; this is to be removed by the curette, and as a small incision admits the introduction and use of this instrument with equal ease as a larger one, I conceive it, for other reasons, to be preferred. As the iris receives a greater support from the cornea when the incision is small, the vitreous humor is not so likely to be evacuated, which to me appears evident, by Mr. Gibson's mode of extracting a soft cataract through a puncture in the cornea; and as the lips of the incision, or margin of the pupil, are not likely to be bruised by the protrusion of a soft cataract, a small incision would heal soonest. But when the aqueous humor has been admitted to the soft cataract, a great portion of it would be dissolved. In every case a soft glary substance adheres to the capsule, and is not to be extracted by the curette, which will be dissolved if the aqueous humor be previously admitted.

To conclude, I consider many of the inconveniencies attending the usual mode of extraction to be avoided by diminishing the extent of the incision of the cornea, and reducing the size of the cataract by the preparatory puncture of its capsule, and admittance of the aqueous humor, while the operation itself will be performed more easily.

I shall now propose an instrument by which the capsule may be punctured, the eye fixed, without pressure, on the eyeball, and the incision of the cornea made at the same time The operator taking the instrument, represented figure 1st, enters the needle through the cornea, as he would the cornea knife, he then punctures the capsule by its point. During this part of the operation the eye naturally turns inwards towards the nose, nor has the needle the power of restraining it, pressure should therefore be applied, by the fingers of the operator and his assistant, on the eye-ball, as formerly directed. The needle now traversing the cornea, pierces it from within, outwards, in a similar manner to that in which it was entered, and appears towards the internal canthus of the eye. The eye being now completely under the direction of the needle, the fingers of the operator and his assistant should be removed from pressing on the eye-ball, and be applied to the eye-lids. The operator holding the handle of the instrument in his right hand in operating on the left eye, turns the blade in a direction proper for the common cornea-knife, in beginning the incision of the cornea, depresses the under eye-lid with the little finger of his left hand, and taking the small handle affixed to the blade, between the finger and thumb of the same hand, slides the blade gently forwards, and makes the usual incision. The assistant suffering the upper eye-lid to drop gradually, as the incision is performed, until it covers the flap of the cornea, the operator then removes his finger from the under eye-lid, and the eye-lids are immediately closed.

In using this instrument it is necessary that the needle traverse the eye a little above the line of its transverse diameter, immediately before the sclerotica, because the point of the blade cannot deviate from the direction of the needle; yet the edge is at liberty, and the incision may be too small, by the side of the blade not being parallel to the iris. This instrument, in regard to its edge, resembles the common cornea knife; but it is impossible that its point can err, the needle having traversed the cornea properly. All that is requisite to form the incision aright, is to traverse the cornea with the needle, a little above the line of its transverse diameter, immediately before the sclerotica, the side of the blade being parallel to the iris; the right hand then having only to retain this position of the instrument, the finger and thumb of the left performs the incision by sliding the blade forwards. If the right hand be held steady during the incision, the edge cannot begin too soon to cut its way downwards, nor can the aqueous humor escape if the blade be of a proper form. Should the aqueous humor escape, and the edge of the knife become enveloped in the iris, the ring finger of the left hand is at liberty to make the friction on the cornea, as directed by Baron de Wenzel.

The Baron forbade all pressure upon the eye, in making the section of the cornea. Mr. Ware is of opinion that pressure is necessary to fix the eye-ball, and that the aqueous humor cannot escape before the cornea-knife has performed what he calls punctuation: he then recommends that all pressure be removed during the section of the cornea, or the remaining part of the operation.

I have always observed that part of the aqueous humor is ready to escape upon the slightest puncture of the cornea; and the more so upon pressing the eye-ball. The cause of this can be demonstrated. The blade of the knife occupies part of the anterior chamber, a portion of the aqueous humor must therefore escape, to make room for the knife; or the coats of the eye be unusually distended. Pressure lessens the dimensions of the eye-ball, and increases the distension. Pressure should therefore be avoided as much as possible. But it is necessary that the eye be fixed.

The needle is conceived to perform that part of the operation which may be called punctuation; nor is it so likely as the cornea-knife, to cause the evacuation of the aqueous humor, in traversing the cornea and fixing the eye. And although the cornea-knife must afterwards traverse the cornea, and perform what Mr. Ware calls punctuation, yet no pressure will then be necessary, as the eye is fixed by the needle. Besides, the attention of the operator is not turned towards the point of the blade, but towards its edge; as he knows it cannot err though the edge may. By thus using this instrument the capsule is readily punctured, and the section being completed, the lens is protruded, and the eye immediately closed.

So long as I conceived it neccssary that the incision of the cornea should be nine sixteenths of its circumference, I considered this instrument might be of considerable use both to fix the eye, to puncture the capsule, and to prevent the iris from being wounded; but now that I conceive it proper to diminish the size of the cataract by admitting the aqueous humor through a puncture in the capsule, it is necessary that the puncture be made sometime previous to the incision; consequently the needle can only be useful in fixing the eye: and as the incision should be less in this, than in the usual mode of extraction, the evacuation of the aqueous humor is not so likely to take place, nor the iris to be wounded.

SECTION VI.

On a new mode of extracting the cataract through an incision in the sclerotica.

HOWEVER perfectly I may be convinced of the necessity of a more close investigation of the diseases of the eye, and their treatment, than has hitherto been bestowed on the subject, I am not of opinion that the mode of operating which I am now about to propose, can be often practised with equal success to the several modes already made use of. Yet as I have some hopes of its occasional utility, and as the mode of performing it is simple and easy, I shall describe the manner in which it may be done. A puncture is to be made, by a couching needle, in the sclerotica, at the distance of a little more than a line from its union with the cornea. Through this puncture a small hook is to be introduced, which is to be directed behind the capsule; so much only of it is to be introduced that its point when brought forwards, will reach the centre of the crystaline. If the length of the hook from its handle, be little more than the diameter of the eye, the operation may be performed with greater facility, being now very similar to couching. If, in bringing forwards the point of the hook, the cataract is percieved to be pushed forwards, and the pupil dilated, the operator will discover that it is of a firm consistence. When the hook has got sufficient hold of the cataract, that it may be removed from the axis of vision, the hook is to be withdrawn until resisted by the coats of the eye. The operator holding it, with the cataract affixed to its point, in the left hand, the patient's eye being turned inwards towards his nose, makes an incision with his right, by a common scalpel through the sclerotica. The incision is to be begun at the puncture, and carried outwards, in a straight line, towards the external canthus of the os frontis. It should not be made directly into the eye, but in a slanting direction through its coats. When the incision is of sufficient extent to permit the extraction of the cataract, it is to be withdrawn on the point of the hook. The lips of the wound should be neatly adjusted, and the eyelids closed.

It is obvious that only a hard cataract can be extracted in this manner, for the same reason that a hard one can only be depressed by the needle, in the operation of couching, because the hook would readily pass without resistance through the pulpy substance of the soft cataract. Should the hook pass without resistance through the cataract, the anterior portion of the capsule should be freely lacerated by its point, and the aqueous humor admitted. In this case the incision of the sclerotica should not be made, as the cataract could not be extracted, but must be suffered to remain to be dissolved in its natural situation. Its substance should be broken down, in order that its solution might the sooner take place.

Inflammation of the sclerotica has always been considered a very formidable disease, so much so, that when it has become violent, the eye has been frequently lost. It certainly therefore would be imprudent to excite inflammation by an incision in the sclerotica, in order to extract the cataract through it, even supposing it may be done with much more ease than through the cornea.

I am now making experiments on the eyes of inferior animals, to ascertain what degree of inflammation may be expected to follow an incision in the sclerotica. If I find it to be much less than is commonly believed, I shall be very happy to relate the fact; as the operation in some cases may be very easily performed in this manner. In those cases where the cataract is suffered to remain to be dissolved by the aqueous humor, I have reason to believe that it may be of some consequence towards relieving the subsequent symptoms, to evacuate the aqueous humor through a puncture in the cornea, and thus for a time to take off the tension of the coats of the eye.

Baron de Wenzel mentions, in a manner rather too ludicrous, a Mr J** who announced to the public a new mode of operating for the cataract He made his first incision through the inferior part of the sclerotica, at the distance of a line from the cornea, with an instrument resembling the ace of spades. Through this incision he introduced another instrument like a small hook, which he made use of to search, and as it were, fish for the crystaline; but unfortunately he fished out a large portion of the vitreous humor. There could be no occasion for much searching or fishing, as the Baron expresses it, as the lens could be as readily found with the hook, as with a couching needle. And perhaps his want of success in a great measure arose from his injudicious choice of the instrument with which he made the incision.

SECTION VII.

On the extraction of the opaque lens with adhesions to the iris.

IT sometimes happens in cataracts which have been long formed, that not only the capsule, but also the lens, adheres to the iris. This may frequently be discovered prior to operating, from the fixed, immoveable, state of the pupil: however, the pupil may also be immoveable, as is well known, from disease of the retina. When the adhesion to the iris is only partial, and at some little distance from the pupil, leaving its margin free, some degree of motion may remain to it in those cases. Again, the pupil may be immoveable when there is no adhesion to the iris, nor disease of the retina, by the pressure of the crystaline on the iris. The state of the pupil is not therefore always a certain criterion.

When adhesion has taken place between the iris and capsule only, the lens may be readily extracted, if the pupil be not in a state of contraction; yet, if the adhesion remain after the operation, it will cause an immoveable state of the pupil.

Although it more frequently happens that the pupil, after the operation of extraction, loses, in some measure, the power of contraction and expansion, yet sometimes the contrary is the case, when adhesion is removed, or the iris was pressed upon by the crystaline, previous to the operation. Happily however for the patient, the pupil is generally in a state of greater expansion after the operation, which admits a greater number of rays of light than ordinary, he therefore sees better in a faint light, and also enjoys a wider range of vision; at the same time, the half closing of the eyelids shade the eye in a stronger light, and partly answer the purpose of contraction of the pupil.

It is frequently the case, that after severe inflammation, not only the capsule, but also the crystaline itself, adheres to the iris. In such cases, though the incision of the cornea has been made of sufficient extent, and the capsule punctured, the lens does not escape from the eye. Nor will it be protruded through the pupil into the anterior chamber, even on the application of such pressure as might endanger the rupturing of the posterior portion of the capsule, and membrane of the vitreous humor, or separation of the iris from the cillary process.

Baron de Wenzel, on like occasions, was in the habit of using a golden needle, which he introduced under the cut cornea, and moved, in different directions, round the circumference of the crystaline. This method he appears, from the cases related by him, to have practised with considerable success. In one of the cases which he relates, the eyes of the patient were in a continued convulsive motion, which rendered the introduction of the needle very difficult to puncture the capsule, and still more embarassing to destroy the adhesions. He was of opinion that a speculum oculi would have here been of no use, but rather have been detrimental, as it would have increased the irritation of the eye, and by its undue pressure, would probably have forced out the vitreous humor. I am of the same opinion, under those circumstances, yet the speculum oculi of Pellier, would be of considerable use in fixing the eye; and were the capsule punctured, and the adhesions destroyed through a puncture in the cornea, the pressure produced by it could not possibly cause any injury to the eye. Did adhesion take place between the capsule and iris only, it would be a matter of but little importance, but when the crystaline becomes adherent to the iris, through the medium of the capsule, the consequences are very different.

In a state of health the lens is contained in its capsule as in a bag, without any connexion of vessels whatever. And when adhesion takes place in disease, it never first commences between the capsule and lens, but arises from the accession of vessels from without, passing through the capsule upon the lens. When, therefore, adhesion exists between the anterior portion of the capsule and the lens, the iris is generally concerned, and adheres to the capsule; not only so, but adhered to the capsule prior to the capsule's adhering to the lens, and owing to its great vascularity, was the seat of the disease.

Every day's experience shews it to be practicable to remove, with safety, a slight adhesion of the capsule to the iris, after the section of the cornea has been performed; but when the adhesion is extensive, it is not to be removed on the first attempt, without doing irremediable injury to the eye of the patient. Mr. Hey relates a case where he did not succeed in removing the adhesion of the cataract until he had six times performed the operation of couching. He observes, " By this gentle procedure, " I was enabled to destroy a very strict adhesion " of the crystaline, and its capsule to the " iris, without injury to this delicate membrane. " I am strongly inclined to believe that had " I, through fear of being foiled in an operation, broken down the adhesion at once, I " should have sent my patient home in total

" darkness: whereas I had the pleasure of seeing
" him restored to as perfect a degree of sight
" as is usually enjoyed with the loss of the
" crystaline humor."

Having already given my unlimited approbation of a cautious procedure, I have only to remark, that it does not appear that repeated attempts, if conducted with propriety, have any tendency to increase the adhesion; and as I do not know a more remarkable proof of this than the fourth case related by Mr. Hey, in the last edition of his Surgery; to this case I refer those who may differ from me in their opinion.

I would not be understood to recommend the operation of couching as the best means of removing adhesions of the iris and cataract; but I conceive the mode adopted in this operation, to be preferable to that of extraction, because, not even the most skilful operator, having divided the cornea, would be sufficiently willing to relinquish or repeat the operation in a case of such difficulty that he could not remove the adhesion. Nor will even the most dexterous operator by any means, always succeed at one attempt to destroy such extensive adhesions as may be gradually removed by repeated efforts.

The needle being introduced through the divided cornea is more at liberty, and can be much more successfully used to destroy adhesion, than when introduced through a puncture in the sclerotica, but a very small incision of the cornea equally affords all the conveniencies of operating as a large one, and may be repeated with almost a certainty of success in the end, and without injury to the transparent cornea.

When, therefore, the operator suspects adhesion to have taken place, from a knowledge of the symptoms, or when he sees the edge of the pupil drawn backwards, on attempting to puncture the capsule, he should either move the needle with which he makes the puncture round in different directions, or make use of one, with a blunt point, more suitable for the purpose, to remove the adhesion. Should this not be accomplished, on account of the smallness of the puncture, it might be a little enlarged. A very small incision can only be necessary to admit the free use of the needle. It is common to say that the needle should be turned in *all directions*. This cannot be done without injury to the eye; and if adhesion has taken place on the side next the external angle of the eye, not even the usual incision of the cornea will permit the needle to be turned in that direction with safety.

Probably it may be easier to remove the adhesion between the iris and capsule, than between the capsule and lens. Both adhesions should be attempted to be removed ; but if the adhesion between the capsule and iris be destroyed, a portion of the anterior capsule may afterwards be extracted, adhering to the iris, as has sometimes been the case. During this very difficult part of the operation, the eye, as has already been observed, may be safely fixed by the speculum oculi of Pellier, if necessary, and there will be no danger of the evacuation of the vitreous humor. Should the adhesion not be completely destroyed, the aqueous humor being admitted will diminish the size of the cataract, and render its extraction more easy, when the section of the cornea is afterwards made, yet, if the adhesion has been very extensive, some difficulty, if not removed by repeating the operation, may still remain to be then encountered.

If the adhesion between the iris and opaque lens has been easily destroyed at the first attempt, and very little time has been occupied, the cornea may be immediately divided in the usual manner, and the lens extracted. But if the adhesion has not been removed until after many repeated attempts, it might be better to delay the incision of the cornea until the eye had completely recovered from any effects which might succeed by the irritation excited. Should some considerable time intervene between the removing the adhesion and the section of the cornea, an incision, of less than ordinary dimensions, could only be necessary. The same would be the case if several attempts were made at different times to remove the adhesion before it was completely destroyed, as the aqueous humor would, during the time intervening between the operations, have diminished the size, and changed the consistence of the cataract. Perhaps, in some cases, the small incision of the cornea would only be requisite.

SECTION VIII.

On the extraction of the opaque lens, with or without adhesion to the iris, the vitreous humor being diseased.

ALTHOUGH it is not a very common occurrence, where an operation may be successfully performed, that the vitreous humor is in a state of disease, and its capsule destroyed, yet it sometimes happens. In this case, on attempting to puncture the capsule of the lens, the crystaline plunges to the bottom of the eye, and is sometimes not to be seen through the pupil, and becomes more depressed at every attempt to extract it.

When the cornea has been divided, and this takes place afterwards on attempting to puncture the capsule, the operator could not, with a good grace, suffer it to remain, even allowing it to be removed from the axis of vision, and that he was satisfied it would not impede the admission of light to the retina, and could not be extracted but with the risk of evacuating a portion of the vitreous humor. But the operator having only made a trivial puncture in the cornea, which in a few hours would heal and completely disappear, so as not even to be perceived to have been made; were the crystaline to be removed from the axis of vision, and depressed among the vitreous humor, on endeavoring to puncture the capsule, it certainly would be prudent to proceed no farther in the operation, at least for the time. Did it continue depressed among the vitreous humor, leaving the pupil free, and the admission of light to the retina unimpeded, all that could be desired had been obtained. And should it, at any after period, resume its natural situation, it might be again depressed by the couching needle.

But should the operator be desirous of removing it from the eye-ball, this might easily be affected. In those cases in which the vitreous humor is in a state of disease, the cataract is commonly of a small diminished size, being only the remaining nucleus of the opaque crystaline. A puncture being made in the cornea, a small hook might be introduced through it, by which the lens might be laid hold of, and removed into the anterior chamber of the eye. It might now be suffered to remain to be dissolved by the aqueous humor; or should this not be thought proper, an incision of the cornea might either be now or afterwards made, and the operation of extraction performed. The eye-lids should be immediately closed, as a considerable portion of the vitreous humor, from its then dissolved state, would be in danger of being evacuated. I certainly however, being aware of these circumstances, would prefer the operation of couching, to that of extraction, as being by far the safer of the two.

But if, after having divided the cornea, the vitreous humor is ascertained to be in a diseased state, the discovery is made at too late a period to be of any practical utility; and the operator might either be obliged, however unwillingly, to relinquish an unsuccessful operation, or the patient be for ever deprived of useful vision.

Sometimes a very different accident takes place, and instead of the opaque lens retiring to the bottom of the vitreous humor, it is hastily protruded from the eye, bringing along with it the anterior portion, and sometimes the whole of its capsule, and is immediately succeeded by a large portion of the vitreous humor. "The crystaline humor is sometimes reduced "almost wholly to the state of a purulent fluid, "in the centre of which a very small nucleus "only remains solid. In such cases the capsule "becomes disengaged from its adhesion to the "neighbouring parts, and, with the crystaline "contained in it, very nearly resembles an "hydatid tumor. This species o the cataract

" is not difficult to be discovered. The pupil
" is entirely filled by it, being very often im-
" moveable, and the crystaline appears to be
" very white. A small projection of the iris
" may also be observed, which is pushed for-
" ward by the hydatid behind it; and in con-
" sequence of this, the space of the anterior
" chamber is diminished."—*Baron de Wenzel.*

In those cases, in order to prevent the too hasty protrusion of the lens, and escape of the vitreous humor, the Baron performed the incision upwards and inwards, and the success which attended this mode of operating, shewed the propriety of the intention. No mention is made by him of the dimensions of the incision, which, it is evident, however, ought to have been less than the usual size, as the less the incision was made, the less apt would the vitreous humor be to escape. The yielding elastic capsule, like an hydatid, could give but little resistance to its exclusion through the pupil and divided cornea: besides, it should be the intention of the operator rather to retard than to hasten it. The mode of operating proposed, section the fourth, is particularly adapted to this species of cataract, and state of the vitreous humor. Were the capsule punctured, through a small incision of the cornea, the milky fluid would be diffused into the anterior chamber and evacuated. The small hook should then be introduced through the incision, to lay hold of the capsule and withdraw it from the eye. A pair of small forceps might also be used in the same manner, and with a little more safety to the iris. By this means, the escape of the vitreous humor will be almost certainly prevented. The incision of the cornea should be but small, according to the size requisite for the extraction of the empty capsule. All pressure on the eye, during the operation, should be avoided, and the eye immediately closed.

When the opaque lens is of a soft consistence, or in a state of fluidity, adhesion to the iris seldom takes place. In hard cataract adhesions are much more frequent. When, therefore, a hard cataract adheres to the iris, and at the same time the vitreous humor is in a state of disease, the difficulty is very great. On what I chiefly rest one great objection to the usual mode of operating is, that these circumstances cannot be always previously known by the operator, and may occur in such cases, as from the appearance of the eye, he could not be justifiable in refusing to operate.

Let us therefore view the operator in this very distressing situation. The section of the cornea performed, the capsule of the vitreous humor destroyed, the cataract adhering to the iris, and at every attempt to remove the adhesion, turned aside by the point of the needle moving on the adhesion as on a hinge, and suffering a portion of the vitreous humor to escape. It is possible, and barely so, that a very dexterous or determined operator might occasionally even surmount such difficulties, aud some degree of vision be restored to the patient.

I am fully persuaded, under such circumstances, a more cautious procedure presents a much fairer prospect of success. The needle being introduced through a puncture in the cornea, and the capsule punctured in the mode formerly proposed, should it be discovered that the lens adhered to the iris, the adhesion might be removed, or generally after repeated attempts, if not at first. Should the lens be again and again turned aside, and the vitreous humor present itself behind the pupil, it would have no tendency to escape into the anterior chamber, so long as it was occupied by the aqueous humor.

Granting the operator thus to have succeeded in puncturing the capsule, and removing the adhesion, he is now fully aware of what is to be expected, and may accordinly adopt his mode of operating. The mode which I propose is, to diminish the size of the cataract, or reduce it to a soft consistence, by permitting it to remain freely exposed to the aqueous humor. When it is afterwards judged to be in a fit state to be extracted through the small incision of the cornea, this is to be attempted in the mode already described in a former section. The practicability of the attempt has been statisfactorily proved by Mr. Gibson, in his mode of extracting the soft cataract through a puncture in the cornea. I have formerly remarked that I was of a very different opinion with that gentleman, in regard to couching as the preparatory operation, because, in every case where it is performed, the posterior portion of the capsule and membrana vitrea are destroyed: yet his having operated successfully, is a sufficient proof of the practicability of this operation. In the cases in which he operated, the cataract was of a soft consistence. This is a matter of little importance, as every cataract becomes soft by being exposed to the aqueous humor. Nor do I believe that the solution of the lens can be the cause of irritation, so long as it remains in its natural situation.

It is not proper, and often not practicable, to perform extraction when the cornea is small and flat, the iris convex, and partially adhering to the cornea. If to all this were added, the cataract adhering to the iris, and the membrana vitrea destroyed, it is impossible that the usual mode of extraction could succeed, and no operator of experience would attempt it. But the case is not absolutely hopeless. And as the small incision occupies so little of the circumference of the cornea, the cataract may be extracted by this slow procedure, nor will a considerable diminution of the anterior chamber, or adhesion of the iris and cornea, prevent the success of the operation, although the difficulty may be thereby increased.

SECTION IX.

On the different modes of operating, by which the several kinds of membranous cataracts may be removed from the axis of vision, or extracted through a puncture in the cornea.

THE several species of cataract hereafter to be noticed, may be thus distinguished. The capsular, is when the opacity consists in the capsule of the crystaline. It may be congenital or take place after birth, or may not appear till after an operation to remove the opaque lens from the axis of vision. The lymphatic is formed by the coalescing of the fragments which remain after an operation, and, becoming accumulated in the pupil, adhere together in consequence of their viscidity The third, which has not frequently been mentioned by authors, is a new production, in which organization may have taken place, more or less, perfectly.

It is easy to be accounted for, why the loose floccullæ, which remain after an operation, become occasionally accumulated in the axis of vision, from the friction of the eye-lids on the eye-ball, and from the contraction of the recti muscles, on the same principle by which they are collected there by the operator rubbing the eyelids, by the point of his finger, after an operation. But that this species of cataract can possibly form an obstruction to vision, which the aqueous humor will not in time remove, is in direct opposition to the very principles on which these observations rest. And if occasionally an operation ought to be performed, to remove a lymphatic cataract, rather than leave the patient long in anxious suspense, it commonly can be had recourse to only on account of the impatience of the patient or operator.

The mode of operating in membranous cataract should vary according to the circumstances of the case. And however desirable it may be to the operator, to be able before-hand to give a circumstantial account of the operation to the patient or his relations, this, at least on the present occasion, should by them be dispensed with.

" It is not unusual with medical men to
" speak, nor has it been unusual with medical
" authors to write, in a very unqualified manner
" concerning the extraction of the capsule of
" the crystaline humor; from which inaccurate
" mode of expressing themselves we might be
" led to imagine that the capsule might be

" taken away with as much ease as the crystaline
" itself. This however is a very mistaken
" idea."—*Mr. Ware.*

Unless the capsule has been completely separated from its connexion with the membrana vitrea and ciliary processes, either by disease, which is seldom the case, or during the operation, which is still more rare, so much only of its anterior portion, as from its opacity prevents the rays of light from falling on the retina, should be removed. This will be attended with more or less difficulty in proportion as disease may have changed the capsule into a membrane of more or less elasticity or toughness.

Some distinctions of color have been pointed out by oculists as characteristic marks of the degree of consistence assumed by the capsule. They are too numerous to be mentioned, and none of them can be relied upon as certain.

The mode of operating to be here proposed is, that a flat thin needle be introduced through the cornea; with this the secondary cataract should be attempted to be broken, and removed into the anterior chamber of the aqueous humor, where it may either be suffered to remain until dissolved and absorbed, or removed through the small incision in the cornea, as the operator may think proper.

If the membranous cataract be of a brittle texture, and easily ruptured, or of a soft pulpy consistence, it may be destroyed by the needle. But if it possess great elasticity and toughness, it may be attended with some difficulty to be punctured, even with a needle having a sharp spear point. The small hook may be introduced through this puncture, and passed behind the opaque capsule, until it nearly reaches the opposite side of the pupil. The point of the hook is then to be turned forward, and to pierce the capsule from behind towards the cornea. Care must be taken not to include the opposite margin of the pupil, nor do any injury to the cornea by the point of the hook. It is now to be moved in different directions, and gently withdrawn towards the puncture in the cornea. If the opaque membrane possess a moderate degree of tenacity, a considerable portion of it may thus generally be removed. Sometimes the whole of the capsule may be brought away by the hook, but this never takes place unless it be separated in part previously by disease. I have no objection to the moderate use of the hook and forceps; on the contrary, I think one or the other may be tried; but I have no opinion that they can be so generally used with such success as is believed.

If the pupil retain its natural power of expansion, the patient should be seated with his back to the window, and no more light admitted into the room than is necessary to enable the operator to distinguish plainly the different parts of the eye. In this situation the pupil will become considerably expanded. The cornea being punctured with a needle or small bistoury, having a cutting edge on one side only, and shaped like the blade of the common cornea-knife, the capsule is then to be punctured as near the margin of the pupil as possible, not to wound it, on the side next the external angle of the eye, and a little below the line of its transverse diameter, the edge of the bistoury being turned downwards. Its point is then to be directed behind the capsule until it reach the opposite side of the pupil. The operator now turning the handle of the bistoury back towards the temple of the patient, its point will again puncture the capsule and appear before it. The operator thus raising the capsule on the point of the bistoury, through the pupil, gently guides the edge forwards, and makes a semicircular incision of the capsule, he then repeats the same process towards the superior edge of the pupil, with the edge of the bistoury turned upwards, and makes another similiar incision. These two divided flaps will only adhere by a small septum, and may be easily removed. It is evident this mode of operating should not be attempted unless the pupil be in a state of considerable expansion: otherwise the edge of the pupil would be unavoidably wounded. At all events the utmost attention to the edge of the bistoury will be requisite.

If the membranous cataract, being removed from the pupil, occupies too much space to be suffered to remain to be dissolved by the aqueous humor, a small incision in the cornea should be made, and it should be extracted by a hook or curette.

Sometimes the membrane is so brittle and easily torn that the hook, instead of extracting any portion, merely makes a rent in it. In this case it might be easily punctured in the mode practised by Baron de Wenzel, which I shall here describe from Mr. Ware. " A fine pointed " instrument, somewhat smaller in size than a " round couching needle, and a little bent towards the point, should be introduced under " the flap of the cornea, with its bent part " upward, until its point be parallel with the " aperture of the pupil; the point should then " be turned towards the opaque capsule, which " is to be punctured by it, in a circular direction, " as near the rim of the pupil as the instrument " can be applied without hurting the iris. " Sometimes the part included within the punctures may be extracted on the point of the " puncturing instrument; but if this cannot be " done, it should be taken away by means of " a small forceps."

When the needle passes easily through the membrane, all these punctures might be cut into one incision, and the central piece be removed whole from the pupil. But if the capsule be very tough, it may not be proper to apply so much force as to remove it by the needle, nor even by the small forceps, introduced after the punctures are made. I am here of my usual opinion, that too much precipitancy is the bane of operating for the cataract. After the capsule has been thus punctured, and cannot easily be removed by the forceps, I conceive it proper to suffer it to remain some time in the eye. The small incision in the cornea will readily heal without inflammation, as it is to be observed, I by no means think the usual division of the cornea necessary to remove a secondary cataract. As soon as the eye is in a fit state to be again operated on, a small incision is to be made in the cornea, through which the hook or forceps are to be introduced. The operator will probably now easily succeed in removing the central portion included within the punctures, and in a great measure separated from the rest of the capsule. It is my opinion that the aqueous humor, in a very little time, would change the central piece surrounded by the punctures, into a soft pulpy substance. Baron de Wenzel, jun. instead of puncturing the capsule, as practised by his father, used a pair of small forceps, which he introduced under the divided cornea, and with them laid hold of the membrane; he then gently turned the forceps between the fingers, so as to twist off a portion of the capsule, or wholly separated it from the ciliary processes.

"The father's mode appears to me to be "preferable to that which is recommended by "the son; since the capsule not only forms "a complete bag to contain the crystaline, but "is often so strongly attached round its rim "to the extremities of the ciliary processes, "that it would require no small force to remove "a portion of it with a forceps, unless this por-"tion were first, in some degree, detached by "means of the puncturing instrument above-"mentioned."—*Mr. Ware.*

I conceive there is considerable danger attending the use of all instruments, by which any portion of the capsule is to be forcibly removed or torn; therefore the use of the small hook and forceps must be very limited. An instrument similar to a small hook, with a cutting edge made concave, and turned inwards towards the handle, might be of use in separating the space between the punctures, and laying them all into one incision. As the change of instruments should be avoided as much as possible, this instrument might answer as well as any other to make the punctures, were its point not too much incurvated. A variety of other modes may be practicable, but I am apt to believe where the needle cannot break down and remove the membranous cataract, and where too much force must be applied to remove it by the hook or forceps, the mode of puncturing the capsule, and either immediately removing it, or suffering it to remain until acted on by the aqueous humor, and then to remove it, is the best mode that has hitherto been proposed.

This mode of operating can only be necessary where the opaque capsule has not been previously lacerated by the removal of the cataract, or where it has united after the operation. If the crystaline has not been already removed, it is evident that it can be of no farther use towards vision. If it be opaque it will necessarily intercept the rays of light; if it be transparent it will become opaque, and the capsule being removed, in a short time it will be dissolved by the aqueous humor, and totally disappear. When the capsule is opaque, and the lens has not been removed, the capsule should first be perforated, and the lens removed afterwards.

The usual mode of extracting the crystaline, immediately after perforating the capsule, on many occasions cannot be successfully performed, even in such cases as admit of cure by a different mode of operating. "When "an opacity of the capsule is the consequence "of violence done to the eye, as of an attempt "to depress the crystaline, or when it proceeds from an internal inflammation of this "organ, an adhesion not unfrequently takes "place between the anterior part of the capsule, and the posterior surface of the iris, "which adhesion usually occasions a contraction of the pupil, and prevents this aperture "from dilating and contracting with so much "freedom as it ought, and as it would do if "the iris were unconfined. Such a state of the "eye appears to me to be a very strong objection to the performance of any operation, "since the degree of adhesion cannot be ascertained; and when the adhering parts are separated, the violence which must unavoidably "be done to the iris, by the passage of the "crystaline humor through the contracted pupil, "will strongly dispose this aperture to contract "still more, and perhaps may cause it to close "entirely."—*Mr. Ware.*

When there is reason to believe that the eye is in such a state of irritability and disease, that any operation, however performed, could only greatly aggravate the pain and inflammation, the case is decidedly hopeless. But it sometimes happens, that after so much inflammation has been excited as to bring on an opacity of the crystaline and its capsule, and also to cause a slight contracted state of the pupil, and adherence of the opaque lens and iris, that all pain and inflammation abate, and the eye, though blind, does not exhibit any symptom of irritability.

In such a case, a slow cautious procedure can do but little harm, and may possibly succeed in restoring some degree of vision. The first attempt should be to remove the adhesion of the iris and opaque lens, in the mode formerly recommended. This being accomplished, probably the pupil will become less contracted: a perforation of the capsule should then be made. The operation being so far successful, it would be exceedingly imprudent immediately to divide the cornea and extract the cataract, as its exclusion might injure the fibres of the iris, and bring on a complete contraction of the pupil. But the adhesion being removed and the capsule perforated, it should be suffered to remain thus freely exposed to the aqueous humor. Afterwards, when judged to be sufficiently reduced in size, and changed in consistence, as to pass easily through the pupil, it might with safety, be extracted through a small incision of the cornea.

Sometimes, in secondary cataract, the vision is diminished by opaque fragments of the capsule, of a triangular shape, attached by their bases to the margin of the perforated capsule, and stretching their apices towards the centre of the pupil. When these fragments are small, and the vision but little diminished, as considerable difficulty and danger of injuring the iris may attend any attempt to remove them, they should be suffered to remain. From the retraction of their apex, and being acted on by the aqueous humor, they generally in time become less. Whereas, when they are large, and instead of being diminished, increase in size, they should be extracted as soon as this is perceived. These fragments may commonly be removed by puncturing their base with a small hook, and then gently turning it in different directions. But in some cases where the capsule adhered to the iris, they have been found to become thick and bulky, and forming a tough knob. In such cases they occasionally were not to be removed even by the iris scissars.

Did this occur so frequently as to merit attention, these knobs might be removed by an instrument resembling a flat canula, armed with a very fine silver or gold wire, and inclosing a little bistoury, having its cutting edge towards the end of the canula. This instrument being introduced through a puncture in the cornea, the wire is to be passed beyond the knob, and then drawn tight, so as to bind it to the end of the canula; the operator then slides the edge of the little bistoury beyond the end of the canula, and separates the knob from the capsule.

In extracting the membranous cataract, I am particularly desirous to recommend on all occasions that as small an incision of the cornea as possible may be made; at one time a puncture with a thin flat needle may only be required, at another an incision equal to the breadth of the common cornea-knife. So long as the aqueous humor is retained, the coats of the eye are distended, and the parts maintain their proper situation; but as soon as it is evacuated, the iris and parts behind it are pressed forwards, and the cornea falls flaccid towards them. How then can any instrument be used with precision in such a deranged state of the eye? On this account I have a particular objection to the too frequent use of the iris scisars, and have endeavored to substitute occasionally for them the instrument last described.

In a case of what is commonly called lymphatic cataract, an operation may frequently be unnecessary, if the patient can be persuaded that after a little time the opaque fragments will be completely dissolved by the aqueous humor and absorbed. But should more time elapse before this takes place than is proper to keep the patient in painful suspense, a flat needle introduced through the cornea, will easily break down and dissipate the lymphatic cataract among the aqueous humor. It will then be quickly dissolved, or may be evacuated along with the aqueous humor, through a small incision of the cornea.

The reticulated secondary cataract is, of all others, the most easily removed; and is sometimes of so very delicate a fabric as to resemble a spider's web, and will fall to pieces upon the slightest touch of the needle. I believe this species to be frequently a new production, and through time it might acquire a greater degree of firmness. I am aware others have considered this as a partially dissolved state of the capsule; perhaps this may in some instances be the case.

It is unnecessary to make any observations on those cases in which the crystaline has been previously absorbed; this most frequently happens in congenital cases, or where the eye had received a blow, or from accidental puncture of the capsule by a small sharp instrument: as the mode of extracting membranous cataract is the same, whether the lens be removed or not.

When the membranous cataract is accompanied by so contracted a state of the pupil, that it becomes necessary to remove a portion of the iris before the capsule can be perforated, the operation will be hereafter described in the mode of forming an artificial pupil.

ON

ARTIFICIAL PUPIL.

In forming an Artificial Pupil two pair of iris-scissars and two bistouries are used, which are hereafter described.

SECTION X.

On the different deranged states of the eye, which may be relieved by an artificial pupil.

WHEN the rays of light are prevented from falling on the retina, by the contraction and total closure of the pupil, if the transparency of the cornea remain uninjured, a portion of the iris being removed, vision may be thereby frequently in a great measure restored. But not only may the transmission of the rays of light to the retina, be prevented by the closure of the pupil, but also by the opacity of the cornea; so that in vain does the pupil remain open to permit the light to pass unimpeded, if the cornea be rendered impervious to its rays by opacity. Total opacity of the cornea has been hitherto, and probably will for ever remain irremediable: but in those cases where a considerable part of it remains transparent, some degree of vision may be restored by the removal of a portion of the iris, opposite that part of the cornea which retains its natural transparency.

Cicatrices from wounds or ulcers, causing opacity in the centre of the cornea, are the cases which very generally require, and may most commonly be relieved by an artificial pupil. A slight opacity or cicatrix near the circumference or margin of the cornea, seldom much impedes vision. Extraction of the cataract therefore scarcely ever renders the cornea so opaque as to obscure the pupil. More frequently is the iris affected by the passage of a large hard cataract through the pupil, its fibres ruptured, and inflammation excited. Perhaps equally often is the iris injured by the unguarded use of the couching needle in the operation of depression.

Inflammation is the constant precursor of the opaque cornea and contracted pupil, which being once excited, from whatever cause, may become extensive. Not only may the pupil be totally obliterated, and the cornea become partially opaque, by a slow but obstinate inflammation, but adhesions more or less extensive, may take place between the iris and cornea. If the crystaline or its capsule have not been removed by an operation prior to this deranged state of the cornea and iris, they also may become opaque and adhere to the iris, and thus consequently render the disease still more complicated, and an operation more difficult and hazardous.

Acute inflammation of the iris generally terminates still more unfortunate, from the consequent effusions of lymph, and the extensive adhesions which take place. But in this case the nature of the disease forbids all hope of relief from any operation.

Thus, although it appears, that besides cataract, there are only these two particular deranged states of the eye which can impede or totally obstruct the rays of light from being transmitted to the retina, that is, obliteration of the pupil, and central opacity of the cornea; yet these two may become complicated with others, which render them less easy to be remedied.

Mr. Gibson enumerates no less than five different deranged states of the eye, and in all these is his mode of forming an artificial pupil, adapted to each, varied in some measure from each other. In like manner, the mode which I propose, of removing a portion of the iris towards its exterior margin, differs from that in which a portion is removed from its centre, but the adhesion, or non-adhesion of the iris and cornea by no means vary the operation.

That portion of the iris opposite the centre of the transparent part of the cornea, is to be removed, and if the whole of the cornea be transparent, the artificial pupil should be formed in the situation of the natural pupil, providing this can be done.

When the crystaline has not been removed by an operation, although it may be necessary that the operator proceed with greater caution, in forming an artificial pupil, lest he wound the capsule of the crystaline, and thereby induce cataract, the mode of operating will not be varied. But supposing the capsule to be opaque, and adhering to the iris, all the difference that will now take place is, that a portion of both the iris and capsule must be removed. In this case, even supposing the cornea to be wholly transparent, it may sometimes be more convenient to form the artificial pupil towards the exterior margin, than towards the centre of the iris or natural situation of the pupil, as adhesions more frequently take place at its centre than towards its circumference, besides it is possible that the central part only, of the anterior portion of the capsule, may be opaque.

SECTION XI.

On the different modes of forming an artificial pupil.

SINCE the time of the justly celebrated Cheselden, who first divided the iris with the intention of forming an artificial pupil, various modes of dividing the iris, or removing a portion of it, have been practised by oculists. Some little difference appears in the accounts given by different authors, of the distance at which he pierced the sclerotica from its junction with the cornea, one making it half a line, another a line and a half; and others have even disputed his veracity, in his description of the operation. It appears however that he pierced the sclerotica at the distance of half a line from its union with the cornea, by a needle having a cutting edge on one side only. He then passed the point of the needle through the posterior chamber of the aqueous humor, and perforating the iris, divided it transversely.

It certainly required the greatest precision not to wound the capsule, nor displace the crystaline, in directing the point of the needle between the anterior portion of the capsule and posterior side of the iris; but his operations were most generally performed after the cataract had been removed by couching, the pupil having become contracted from the irritation excited by the operation. It is not to be wondered at that an operation which required so much manual dexterity, should have been so seldom successfully performed; yet to deny its possibility, would show a want of anatomical information in regard to the internal structure of the eye.

Subsequent operations, however, proved that an artificial pupil, formed by simple incision of the fibres of the iris, did not remain permanent, but united again in a very little time. Nor does it appear to have made any difference whether the iris was divided transversely, in a crucial form, perpendicularly, or in any other way; notwithstanding what has been asserted to the contrary by Janin, Maunoir, and others.

Baron de Wenzel, disappointed in forming an artificial pupil by simple incision, and aware that its want of permanency arose from a common tendency in the lips of every simple wound to unite, thought of removing a portion of the iris, and the event answered his expectation. He performed the operation as follows. " The " patient is to be placed in the same position as " if he were to undergo the operation of having " the cataract extracted; and the cornea-knife,

" described in a former part of this treatise, is " to be pierced into the cornea, exactly in the " same manner as in that operation. When " the point of the instrument has arrived at " about the distance of half a line from the " centre of the iris, it must be plunged into this " membrane to about the depth of half a line, " and, by a slight motion of the hand backwards, " it must be brought out again about the distance of three quarters of a line from the " part in which it entered. Then, pursuing the " incision as it is before described in common " cases of the cataract, the section of the iris " will be completed before that of the cornea, " and will present a small flap nearly a line " in diameter. This section of the iris, like " that of the cornea, will be in the form of a " semicircle."

" A small pair of scissars is then to be introduced under the flap of the cornea, and the " divided portion of the iris is to be cut clean " off."

" By this method an artificial pupil will be " made, which, in consequence of the sudden " and equal contraction of the divided fibres, " sometimes proves to be almost round; and, " after this operation, we may rest assured that " the pupil so formed will never close again."

The Baron's mode of operating was much more successful than that of Cheselden, and followed by less pain and inflammation: it is, however, to be objected to, on account of the smallness of the artificial pupil, and large incision of the cornea, naturally resulting from the use of the cornea-knife.

Professor Scarpa, after stating his objections to a division of the cornea, in those cases where the pupil had become contracted, in consequence of an operation for cataract, or where the eye had been attacked with internal inflammation, proposes to separate a portion of the margin of the iris, from the ciliary process. He had seen this accidentally happen in an operation for removing the cataract; and had likewise observed, in dissections of the eye, the case with which the iris might be separated from the ciliary process, which induced him to adopt this mode of operating, which is performed as follows.

“ The patient being seated, and there held, as
“ in the operation for cataract, with a straight
“ couching needle, not the thick one, which is
“ used by the greater part of surgeons, but a
“ very fine one, to which I give the preference,
“ the sclerotic coat is perforated at the external
“ angle of the eye, about two lines from the
“ union of the tunica sclerotica with the cornea,

" and the point of the needle is made to advance as far as the upper and internal part " of the margin of the iris, that is, on the side " next the nose. The instrument is then made " to pierce the upper part of the internal margin " of the iris, close to the ciliary ligament, until " its point is just perceptible in the anterior " chamber of the aqueous humor; I say just " perceptible, because that part of the anterior " chamber being very narrow, if the point of " the needle be made to advance ever so little " before the iris, it must pass into the substance " of the cornea. As soon as the point of the " needle can be seen in the anterior chamber " of the aqueous humor, it should be pressed " upon the iris, from above, downwards, and " from the internal towards the external angle, " as if with a view of carrying the instrument " in a line parallel to the anterior surface of " the iris, in order that a portion of its margin " may be separated from the ligamentum ciliare. " This separation being obtained, the point of the " needle must be depressed, in order to place " it upon the inferior angle of the commenced " fissure, which may be prolonged at pleasure, " by drawing the iris towards the temple, and " by carrying the instrument from before, backwards, in a line parallel to the anterior surface " of the iris, and the greater axis of the eye."

This has been censured as a rude and ill-devised operation, and the subsequent symptoms have been very much aggravated. It cannot be denied that a considerable degree of pain succeeded the operation, but to what was this to be attributed? To the separation of the iris from the ciliary process, or to the injury sustained by the most delicate parts of the eye, through which he passed the needle? If to the last, change the mode of introducing the needle, and these parts will sustain no injury, nor will the pain follow. The question is, did the artificial pupil thus formed by Professor Scarpa remain permanent? If it did, this operation is not to be so much depreciated, as a more easy mode of separating the margin of the iris and ciliary process will hereafter be shewn. Besides, can it be affirmed that there is no tendency in an artificial pupil formed by the removal of a portion of the iris, to become diminished in size, through time, and at last to be totally obliterated.

I know that when an oblong portion of the iris, extending between the sclerotica and natural pupil, has been removed, the artificial pupil so formed will generally remain permanent. The cause of this is, the two sides of the divided iris can only have any tendency to approach each other, the sclerotica and natural pupil remaining stationary. On this account I affirm that an artificial pupil formed towards the margin of the iris, will be more permanent than one in the situation of the natural pupil.

Mr. Maunoir explains a mode of making an incision diagonal to the fibres of the iris. He supposes the iris to consist of two concentric muscles, the one radiating, the other circular. Notwithstanding his explanation is unsatisfactory, and this incision remains as little permanent as any other, I shall here introduce his description of the operation.

" I begin" says he, " by making an incision " in the cornea, as much as possible on the " external side, whether there be an opacity at " that part or not, about the length of three " lines, and at the distance of half a line from " the sclerotica. This incision should have a " curvature parallel to the circumference of the " cornea, and in general it will not differ from " that which should be made in the operation " for the cataract, except its being much less. " I finish the operation with the instrument " which I shall next describe.

" This instrument is a pair of crooked scissars, " with very thin and narrow blades, of seven or " eight lines in length ; the bend of their border, " near the joint, forming an angle of about one " hundred and forty degrees. The superior " blade, that is to say, that which should be in-" troduced between the cornea and iris, has its " extremity formed like a small olive. The

" inferior blade, that is to say, that which is to " pass through the iris, and be placed between " that membrane and the crystaline, ends in a " very sharp point, and cutting on its back, " for the extent of about one line."

" The manner of using them is as follows: " the scissars are to be introduced flat into the " incision of the cornea; when the point is near " the part of the iris where the incision ought " to begin, they should be turned in such a " manner as that the flat side may be perpendicular to the cornea and iris; they are to be " lightly or gently opened, and then pushed " sufficiently, so that the inferior blade may " penetrate into the iris, the length which the " incision ought to have: then the scissars " are to be closed neatly, and the iris will by " this means be cut."

Mr. Gibson observed, in extraction, the great tendency of the iris to form a staphyloma through the incision of the cornea, and the ease with which this might be cut off with a pair of fine curved scissars, and upon this he founds his mode of operating, which he describes as follows.

" The first step of the operation is to secure " the eye-lids, as in the operation for extracting " a cataract. A puncture is then to be made in " the cornea, with a broad cornea-knife, within

“ a line of the sclerotica, to the extent of about three lines. All pressure is now to be removed from the eye-ball, and the cornea-knife gently withdrawn. The consequence of this is, that a portion of the aqueous humor escapes, and the iris falls into contact with the opening in the cornea, and closes it like a valve. A slight pressure must now be made upon the superior and nasal part of the eye-ball, with the fore and middle finger of the left hand till at length, by an occasional and gentle increase of the pressure, or by varying its direction, the iris gradually protrudes so as to present a bag of the size of a large pin's head. This protruded portion must be cut off with a pair of fine curved scissars, and all pressure at the same time removed; the iris will then recede within the eye, and the portion, which has been removed, will leave an artificial pupil more or less circular.

“ It sometimes happens that the whole breadth of the iris, to the border of the natural pupil, is protruded and removed in this way. This I consider as rather an advantage, because it ensures a large pupil, though generally one which is oblong in its shape. I have found, however, the mere circumstance of shape to be of little consequence in this operation, and always to be sacrificed to the object of size. It may also be remarked, that the

" opening has no disposition to close, when, " in forming the artificial pupil, the border of " the natural pupil is divided."

" It occasionally happens also, that as soon " as the knife is removed, the muscles of the " eye-ball act with violence, and project a small " staphyloma or bag of the iris, through the " incision. If this bag be not large enough to " form the new pupil, the iris must be further " protruded by gentle pressure."

These are the principal modes of forming an artificial pupil with which I am acquainted, nor can we now be at a loss to appreciate their respective merits, or to estimate what degree of success might be expected to follow each mode of operating. Of all these, by far the neatest is that of Mr. Gibson. In those cases where there is no adhesion between the capsule and iris, or cornea and iris, I conceive his mode of removing a portion of the border of the iris, may always be practised with considerable ease and success. His mode of forming the artificial pupil in the centre of the iris, is similar to that of Baron de Wenzel; the only difference is, that he advises the artificial pupil to be made larger. Janin's mode of operating is omitted, as being intermediate to those of Cheselden and Maunoir, and for a similar reason I have avoided mentioning the modes of other authors.

SECTION XII.

On the mode of forming an artificial pupil towards the margin of the iris.

THE formation of an artificial pupil has long been considered one of the most delicate and difficult operations on the eye, particularly in those cases where the crystaline and capsule remain transparent, as it is absolutely necessary to the success of the operation, that all injury to the capsule be avoided, otherwise an opacity and finally the absorption of the crystaline would inevitably follow. The posterior chamber of the aqueous humor, although extremely small, is more capacious towards the border of the iris, than towards its centre, from the convex shape of the lens. There is therefore less risk of wounding the capsule, in removing a portion of the iris towards its margin, than towards its centre.

Besides, an artificial pupil being more permanent when formed towards the border of the iris, than towards its centre, as I conceive this to be a fact; the edges of the newly formed pupil are there also less apt to form adhesions with the capsule, being at a greater distance from it. I therefore think no one can doubt that in those cases where the lens has not been removed, that the border of the iris is the situation in which an artificial pupil may be formed with the most certain prospect of success.

But the vision that can be enjoyed, the artificial pupil being formed towards the border of the iris, is very imperfect compared with that, the structure of the eye being natural. Some degree of doubt may be entertained whether the vision would not be more useful, by an artificial pupil formed in the situation of the natural one, without the aid of the crystaline, than towards the border of the iris, even with the crystaline remaining in a state of transparency. But let it be remembered, that an artificial pupil cannot always be formed in the situation of the natural one, with the same ease that one towards the margin of the iris generally may. It also may be objected, that in order to bring an artificial pupil, formed towards the margin of the iris, into the natural axis of vision, a squinting look and deranged appearance of the eye must follow. Granting this, can a squinting look and deranged appearance of the eye, be put in competition with a greater certainty of a more distinct vision, by this means being restored.

My intention is not to lay down rules to direct the operator, but by these observations to call his attention to a close investigation of the subject, so that in every instance he may adapt his mode of operating to the circumstances of the case. Where only a portion of the cornea is transparent, the artificial pupil should be formed opposite that portion; in those cases no doubt can be entertained as to the situation of the artificial pupil. Although the situation of the natural pupil should always be chosen for an artificial one, when the state of the eye will admit of it, yet this may not always be proper, for reasons already stated.

The operation to be described in this section is, the mode of forming an artificial pupil towards the margin of the iris. The border of the iris towards the external angle of the eye is the most convenient part to be operated upon, and we shall at present suppose this to be the situation in which the artificial pupil is to be formed. In this operation the eye must be steadily fixed, the greatest precision being necessary.

The operator taking a very fine thin couching-needle, pierces the sclerotica immediately behind its junction with the cornea, in the line of its transverse diameter, the point of the needle should barely puncture the inner coat of the eye, lest it wound the capsule of the crystaline. The needle should be entered, as if it were the intention of the operator to push the margin of the iris off from the ciliary process. The sclerotica being thus punctured, the couching-needle is to be laid aside, for the iris-scissars, which are so constructed that the blades, when open to the distance of about half a line, are parallel to each other to the extent of four lines; see fig. 1, plate 2. The point of one blade is rounded off and blunt; the point of the other is sharp and thin, similar to a spear-pointed couching needle. They open by a spring, and, like the forceps, have only one long handle. The blunt pointed blade is to be entered into the puncture of the sclerotica; the other blade will be opposite the margin of the cornea, through which it is to be pierced. The points of both blades being then directed forwards, till opposite the margin of the pupil, the border of the iris will be included between them. The points should now be turned towards the lower margin of the pupil, and closed, by pressure with the fore finger on the short handle; an incision of the whole breadth of the border of the iris, beginning in the line of its transverse diameter, and extending to the lower margin of the pupil, will thus be made. The points being now allowed to be opened by the spring, are to be next turned towards the superior margin of the pupil, and again closed; another incision of the whole breadth of the border of the iris will be made, beginning in the line of its transverse diameter, and extending to the superior margin of the pupil. Thus will a triangular portion of the exterior border of the iris be removed. The scissars being withdrawn, the small hook is to be introduced, and the divided portion extracted through the incision.

During this operation the aqueous humor will not be evacuated until the scissars are withdrawn, consequently they can be used with the greatest precision, the parts of the eye retaining their natural tension and situation. The incision thus made will not exceed two lines in extent, and if proper care be taken in piercing the cornea, and in closing the scissars, it will not be in the least ragged, but the lips clean and smooth cut. Although a portion of the exterior border of the iris is most conveniently removed, yet the superior or inferior border may also be removed in a similar manner. The incision will be sufficiently large to permit the extraction of the divided portion of the iris, and as it extends but very little way into the cornea, not more than a line, cannot be the cause of any cicatrix to obscure the artificial pupil.

Sometimes in a diseased state of the cornea, when it is slightly opaque towards its edges, accompanied with central opacity, although it is absolutely necessary that the artificial pupil be formed towards the border of the iris, yet the morbid vascularity of the cornea will not permit any incision to be made in it, opposite the intended situation of the artificial pupil, because, if an incision be made, the cornea will become opaque, and the artificial pupil, when formed, be of no service. In this case it may not be proper to make the incision in the transparent part of the cornea, but in the central opaque portion, and more towards the opposite border than towards that in which the artificial pupil is to be formed. The blunt pointed blade will then be introduced through the pupil, and the incisions made as before; but the divided portion will be attached by its base, the scissars being withdrawn, it may be separated from the ciliary process by the small forceps. The flap of the iris may be very readily separated at its base by the canula and bistoury already mentioned; and also by a pair of fine scissars with their points bent to one side at a right angle. The scissars will be easily introduced shut through the incision, and their points, on being guided towards the base of the flap, are to be opened, and one insinuated under it, the other above it. When the natural pupil is obliterated, in whatever situation the flap is formed, it would be attached to the iris by its base, the same means requisite to remove it in one case, will be equally applicable to the other.

The success of the operation may be defeated by a diseased state of the iris, which may be generally known by its villi assuming a dusky unnatural color, and its surface instead of being plain and smooth, is shrivelled and uneven. If the pupil be at all to be discovered, it is generally immovable, the apeture irregular, its edges rugose, and stellated. The iris so diseased, when cut, frequently bleeds so profusely as to prevent the operation from being farther proceeded in. Or should a portion of it be removed, the opening becomes contracted, and the divided edges are apt to become united. Should the capsule adhere to the posterior side of the iris, as it very frequently does when the iris is diseased, it may not be possible to remove any portion of the iris, and the operation will not only be unsuccessful, but may be followed by violent symptoms of inflammation; so that the situation of the patient is rendered still more hopeless and uncomfortable than before any operation was attempted. When the eye exhibits so many morbid appearances, and is accompanied with pain in the head, and tension of the eye-ball, an amaurosis may be suspected, it would therefore be very improper to attempt any operation.

But there may be cases where the inflammation has been chiefly confined to the iris; or added to this, the crystaline and capsule have become opaque, yet the cornea remains free of injury; or, if at all opaque, is only slightly so round its margin, nor have the symptoms at any time been violent; and even the appearance of the iris itself is not so decidedly morbid, as to forbid any attempt to remove a portion of it. Could a portion of the iris be removed in such cases, were it not for the effusion of blood into the aqueous humor which takes place, it is probable that useful vision might be restored. When the effusion is not very great it is commonly absorbed in a few weeks, and the eye recovers its former transparency. When the eye is in a state of irritability, and the effusion is copious, the irritability is thereby greatly increased, and as the blood becomes coagulated, it is not absorbed for a considerable time.

I would not willingly be accused of making idle experiments, especially where so much is at stake as the human organ of vision; yet having frequently observed the effects of lunar caustic, in ulcers of the cornea and strictures of the urethra, I am very solicitous to know whether a portion of the iris might not be destroyed by the caustic, and an artificial pupil thus formed, seeing it cannot be done by a cutting instrument, on account of the subsequent hemorrhage, and irritation thereby produced*.

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* In order to know what symptoms might be expected to follow the removal of a portion of the iris by caustic, I intend making the following experiment on the eye of an inferior animal: An incision being made in the cornea, and the aqueous humor evacuated, to introduce a canula armed with caustic, and to apply it to the iris so long as may be necessary to destroy a portion thereof sufficiently extensive to form an artificial pupil.

It does not appear that in a diseased state of the iris, Professor Scarpa's mode of separating it from the ciliary ligament, can be practised with more success than that of removing a portion of it by excison, as the effusion of blood among the aqueous humor seems to be equally profuse as in that mode. It is chiefly to be had recourse to in those cases where it may be desirable not to increase the opacity of the cornea: but in order to separate the margin of the iris from the ciliary process, it is not necessary to puncture the sclerotica. Supposing that part of the cornea which retains its transparency to be towards the internal canthus of the eye, a needle, similar to Professor Scarpa's, being introduced into the opaque cornea, and at as great a distance from the transparent part as can be conveniently done, the point of the needle is to be directed towards the internal margin of the iris, and is then to pierce it as near its margin as possible. The operator then gently draws the iris towards the puncture of the cornea, and separates it from the ciliary process to the full extent of three lines, or as far as may be thought necessary. If the lens has not been previously removed, the capsule will be in danger of being wounded by the point of the needle.

Mr. Bell, speaking of the operation of couching, observes, in our most modern system of surgery we are directed to puncture the sclerotica at the distance of one tenth of an inch from its union with the cornea. "To my certain "knowledge, not only the ciliary body has been "injured by this direction, but even the root "of the iris has been seen to be pushed forward "on the point of the needle."—*Mr. Bell.*

If the sclerotica be at all punctured we may avail ourselves of this fact, and with Hey's needle puncture the sclerotica near its union with the cornea. Immediately on perceiving the point of the needle to appear on the inner side of the eye towards the margin of the iris, it is to be withdrawn, and a needle with a blunt point substituted for it. This needle being introduced through the puncture in the sclerotica, the iris may be pushed on its point to any distance from the ciliary process.

SECTION XIII.

On the mode of forming an artificial pupil in the centre of the iris.

WHEN the pupil has become so contracted as totally to obstruct the transmission of light to the bottom of the eye, a portion of the iris should be removed, in order that vision may be restored. So long as any moderate degree of vision remains, this operation should not be performed, as it is always attended with some risk of losing that degree of vision which is enjoyed. It has already been observed that when the crystaline has not been removed by an operation, the artificial pupil is formed with a greater certainty of success towards the margin of the iris: the intention being to prevent the capsule of the transparent lens from being injured. But supposing it to be certain that the crystaline or capsule is opaque, or has been removed by an operation, more perfect vision will be restored by forming an artificial pupil in the natural situation than in any other, also supposing the cornea to be wholly transparent,

Owing to the proximity of the anterior side of the crystaline and border of the pupil, adhesions very frequently take place between them in those cases in which the pupil is obliterated. On this account it is advised by Mr. Gibson, when it is certain that the lens has not been removed, to break it down or depress it by the couching needle, prior to attempting to form an artificial pupil in the situation of the natural one. How can this be done when the iris adheres to the lens, without lacerating the iris, the point of the needle being wholly hid from the view of the operator. I cannot again avoid stating my disapprobation of this preparatory operation of couching, besides its inevitably and needlessly lacerating the posterior portion of the capsule and membrana vitrea, it is not at all probable that the adherent lens can be so separated without tearing the iris. If the lens does not adhere to the iris, it may probably be transparent, and it is not absolutely certain that it will be wounded, providing a proper instrument is used; it should not therefore be so inconsiderately removed.

With me the question is, whether it is better to form an artificial pupil in the situation of the natural one, or towards the margin of the iris, the lens not being removed, and my reasons have already been stated. Although by the mode which I shall hereafter propose, an artificial pupil cannot always be completed on the first attempt, in those cases where the crystaline adheres to the iris, yet so much may be done as to secure its certainty of being accomplished at a future period.

Supposing the cornea to be transparent, and it is determined on to form an artificial pupil in the natural situation, the operator taking the small bistoury, fig. 3, plate 1st, pierces the cornea at a small distance from its union with the sclerotica, and at half the breadth of the bistoury above the line of its transverse diameter. The breadth of the bistoury should be fully two lines. The point of the bistoury being entered to the distance of one third the whole breadth of the iris is to puncture it, and to be passed behind its posterior side, anterior to the capsule of the crystaline, to the distance of about two lines; it is then to puncture the iris from behind forwards. As soon as the point of the bistoury appears on the anterior side of the iris, it is to be carried forwards until it nearly reaches the opposite side of the iris. If the second puncture be not equal in extent to the first, the point of the bistoury may be a little depressed to make it so. The bistoury is now to be withdrawn a little, until its point just appears at the lower end of the second puncture, its edge is next to be a little turned towards the iris, and is again to be carried forwards. By this means a square flap of the iris will be formed, which may be removed by the iris-scissars, on the bistoury's being withdrawn. If the operator be desirous of finishing the incision before withdrawing the bistoury from the eye, the bistoury being only half the breadth above mentioned, by a similar process a small flap of the iris may be formed under the line of its transverse diameter. The edge of the bistoury being then turned upwards, another similar flap of the iris may be formed above the line of its transverse diameter. These two flaps will adhere together, and to the iris, by a small septum, which may be separated from the iris at both extremeties, by the bistoury. The septum however might be more easily divided with the iris-scissars, having their points bent to one side.

The use of the common cornea-knife is attended with so great inconveniencies that I cannot conceive on what principles it ever was adopted. Not only is the incision in the cornea made by it too extensive, but the operator is confined to a progressive motion of its point forwards, or if he withdraw it ever so little, the aqueous humor is evacuated. The blades of these bistouries are exactly similar to the cornea-knife in miniature, but the incision made by them in the cornea is very trivial, and the whole breadth of their blades is introduced into the eye; so long as this is the case they may be moved backwards and forwards with freedom, and the aqueous humor cannot escape. The blade of the lesser one may be turned round in the eye.

If, on having thus formed the artificial pupil, it is perceived that the crystaline or capsule is opaque, a puncture should be made in the capsule in order to diminish the size of the lens by the admision of the aqueous humor. After the eye has become again fit for being operated upon, and the lens is judged to be sufficiently changed in consistence, or diminished in size, the lens or capsule are now to be removed, as formerly described.

If the crystaline adhere to the iris it may not be in the power of the operator to form an artificial pupil on the first attempt. On perceiving this he is to destroy a portion of the iris and capsule, by repeated punctures, of sufficient extent to form an artificial pupil. He may thus succeed, by removing little portions at a time, to perforate the iris and capsule so as to admit the aqueous humor to the crystaline. The operation may be again repeated at any future period, and an artificial pupil of sufficient extent formed, when the crystaline, or rather its remainig nucleus, may be extracted, or the perforation in the capsule enlarged.

The artificial pupil should be fully of the size of the natural one, in a moderate light. Its figure should be as circular as possible. Perfect regularity of figure is unattainable, but if the artificial pupil be of sufficient extent, no great inconvenience can result from its irregular shape. In looking upon an irregular surface, the field of vision is always limited by an irregular boundary, yet we feel no inconvenience from this; so neither will a person having an artificial pupil of an irregular shape, feel any other inconvenience than that of his range of vision being more limited in one direction than another: and indeed he will feel no inconvenience at all except in looking at large objects which are nigh. We should always strive to make the artificial pupil resemble the natural one as much as possible, but we are not to be very anxious about this; nor is it a matter of so great importance as may be conceived, that an artificial pupil in each eye be exactly of the same shape. But as the cornea is not the section of a regular sphere, being flatter towards the internal angle of the eye, it is necessary that the artificial pupil in both eyes possess the same position in the iris, otherwise deranged vision will be produced; even this may be remedied by proper glasses.

When the pupil of only one eye is closed, and the vision of the other is useful, an operation ought or ought not to be performed according to circumstances. When both eyes are affected, that which presents the most certainty of success may either be chosen, or both may be operated upon ; but these and many other things must be left to the determination of the operator at the time.

I have hitherto avoided saying any thing of the after treatment, and have now little more to add than that it should be conducted on the common principles of medicine and surgery. All that in general will be necessary, is to cover the eye immediately after the operation, with a small piece of soft linen or lint, dipt in water of the temperature of summer heat. A bandage should be applied and retained, as recommended by Mr. Ware*. The eye should not afterwards be too hastily exposed to the light, nor should the bandage be too long continued, that is, the time requisite to subdue the subsequent symptoms will be in proportion to the injury sustained from the operation, the state of the eye and health of the patient. In the mere puncturing of the cornea and capsule of the crystaline, little or no inflammation is to be expected to follow; and in a day or two the eye will be in a fit state to be exposed to the light.

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* He also recommends that a dossil of lint steeped in plain water, or brandy and water, be covered with spermaceti or saturnine cerate. The cerate over the lint prevents it, when impregnated with the discharge, from becoming stiff and irritating the eye-lids.

It may commonly be proper to confine the patient to a low diet and acidulated drinks, for a few days after the operation, giving an occasional saline purgative. Should an ædematous swelling of the eye-lids take place, it will frequently subside without any application. If there be much pain in the ball of the eye, or in the eye-brows, accompanied with sickness, an opiate may be requisite. In case of much inflammation leeches may be applied to the temples, or blood taken from the temporal artery.

The intention in all these operations is to reduce the incision of the cornea to the least possible extent. In extracting the cataract it is recommended to avail ourselves of the solvent power of the aqueous humor, which has hitherto, contrary to the principles of true surgery, been almost totally neglected. The small incision of the cornea facilitates the retention of the aqueous humor during the operation, which is conceived subservent to the successful extraction of the cataract or formation of the artificial pupil.

To conclude, however doubtful I may be that these modes of operating will not be soon generally adopted, I am convinced, that in order to give our patients a fair chance of recovering the inestimable blessing of vision, we must proceed on different principles than to tread servilely in the footsteps of our predecessors. I have no doubt but future reflection and experience will discover to me several defects in these observations, but, open to conviction, I shall always be ready to acknowledge their imperfection.

FINIS

OBSERVATIONS

ON

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BY

CHARLES FARRELL, M.D.

SURGEON TO HIS MAJESTY'S FORCES.

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1811.

INTRODUCTORY REMARKS.

I SEE no reason, as far as I can judge at present, to think that ophthalmia, as it exists among the troops in the Mediterranean, differs in any respect from the ophthalmia, which is occasionally observed among our troops on other foreign stations and at home. If this be the case, it cannot be expected that I am to advance much new matter on a subject, which has been so amply and ably treated by others before me. But though I do not lay claim to originality, still I hope it will not be deemed presumption in me to say, that I hope to render this little work worthy of notice, by presenting in it some illustration of the causes of ophthalmia in our army, and by endeavouring to establish a division of the disease into the varieties which it seems naturally to present, and to institute a method of cure adapted to each variety.

I believe it is now pretty generally admitted, that ophthalmia has been more or less prevalent in our army, since the landing of the British troops in Egypt in the year 1801, to the present time. As I have had but little opportunity of seeing the disease in England, and as I have been deprived for the last four years of the means of learning the forms it assumes, or the degree to which it prevails at home, or on any foreign station but this, I must content myself with simply describing it, as it presented itself to me in individual cases, in the British army in Egypt, in the year 1807, and afterwards in the British army in the island of Sicily, in the years 1808, 9, and 10, during the greatest part of which time I was employed in an ophthalmic hospital. By giving an account of what passed thus under my own eyes, I shall furnish to others a basis upon which to form a comparison between the states which the disease assumes in these and other countries.

I am informed by Dr. Franklin, Inspector of Hospitals, that ophthalmia prevailed to a considerable degree among the troops at Malta, for some time after the return of the army from Egypt in 1801; but that it gradually diminished, and was at last nearly extinct in 1805, when some regiments of that garrison embarked for the kingdom of Naples. The British army landed in Sicily early in the year 1806; and in a few months, ophthalmia became much more prevalent among the troops in this island, than it had been for some time previously among those at Malta. It appears to have continued nearly stationary from this time, until the return of the little army from Egypt in the year 1807, after which it raged for a considerable time in several regiments in Sicily. I feel it incumbent on me to acknowledge, that I am indebted to Dr. Franklin, whose accuracy on all matters relating to the medical concerns of the army in the Mediterranean, is far beyond my praise, for the documents from which I have taken this brief sketch of the history of ophthalmia in our army in the islands of Sicily and Malta.

As the practice of medical men in the army in my station, presents the peculiarity of being conducted under the eye, I might say, of being more or less influenced by the favourite projects or opinions of a superior medical officer; it follows that in treating of the diseases of soldiers, as well as in curing them, it is impossible to separate the consideration of the disease from that of the duty and ability of the medical officer at the head of the department. The establishment of hospitals, the selection of healthy situations for military quarters, and many other important matters, relating to the preservation of health of an army, as well as to the medical treatment of the sick, devolve on this individual; and unless he possess enlarged and enlightened views of the nature and causes of disease, and much personal activity, it is, I fear, not to be expected that these objects can be fully accomplished. The subordinate medical officer is obliged to look up to him for support in all his measures, and is taught to count on his judgment and experience in cases of difficulty and danger.

This view of the relations between the medical officers of the army, and the influence of those on the treatment of diseases, will, perhaps, justify me in the eyes of medical practitioners in private life, for entering on a subject which is totally unimportant to them. As I have entered, however, whether justly or not, on the discussion of such a subject, justice would demand it of me, if my feelings and conviction did not dictate to me to say, that it has been my good fortune, and it is with much pleasure I relate it, to serve in the Mediterranean under two medical officers (Dr. Franklin and Mr. Green) possessing, in an eminent degree, all the requisite qualifications for their situation.

I have not been able to learn whether a violent inflammation of the eyes, such as is now observed among our troops, or indeed ophthalmia of any kind, existed at any time in the army, before the expedition to Egypt in 1801. The settling of this point would go a great way towards fixing the origin, and ascertaining the causes of this disease. For my own part, in as far as I have been able to carry my researches into the accounts of the diseases of our army both at home and abroad, I have not been able to discover any marked traces of it before the above period. Cleghorn, as well as I recollect, mentions in his account of the diseases of Minorca, that ophthalmia was prevalent there in the summer season; but I believe he does not say that it prevailed more among the soldiers than the inhabitants. Indeed, many of the ancient and modern physicians, who practised in the south of Europe, treat pretty fully of the disease; and a tolerably accurate description of a violent form of it, but one perhaps less violent than that observed at all times in Egypt, may be found in the writings of some of them. Perhaps, when we are better acquainted with the history and causes of the disease, it will be found that warm climates are favourable to the production of it. All historians, both ancient and modern, who have given us accounts of Egypt, and all medical men, both ancient and modern, who have written on the diseases of Egypt, agree as to the frequency and violence of ophthalmia in that country. Ophthalmia, such as it is observed at this day, among the people of Great Britain, occurred, no doubt, occasionally among our troops at all times; but from the little notice taken of it by medical writers on the diseases of the army, and from the extraordinary frequency in which it occurs, and the great violence it assumes at present, I am inclined to believe that that form of the disease, which has, within the last nine years, proved such a scourge to our army, has been introduced into it in Egypt.* I think it will be also proved in time, when our knowledge of the fact is more extensive and better founded, that an inflammation of the eyes, is much more frequent, and runs to a much higher degree, among the inhabitants of Sicily and other islands of the Mediterranean, than among the same number of people in any part of the united kingdoms of Great Britain and Ireland. This may be owing to a variety of causes; but the most obvious are, the glare and heat of the sun by day, succeeded by the coldness and humidity of the night, and vicissitudes from hot to cold, changes not at all unfrequent in the climate of the southern islands and shores of the Mediterranean sea. Egypt is, perhaps, the part of the world, in which all the causes of ophthalmia, arising from soil and climate, exist in the greatest abundance and force. This circumstance is sufficient in itself to account for the prevalence of the disease in that country; and how far such a combination of causes may contribute to the production of a species of ophthalmia, which by frequency, inveteracy, or other means, may acquire the power of propagating itself by contagion, I cannot take upon myself to determine. As it is probable that the contagious quality of many diseases originated from a source somewhat similar, I see nothing contrary to ana-

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* I do not mean to deny, but that cases of violent inflammation of the eye, as such an affection may be produced by various causes sufficiently obvious, occurred occasionally among our

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troops at all times; but this will not account for the unusual frequency of the disease in the army for the above-mentioned period.

logy in the supposition of the violent species of ophthalmia, observed at present among our troops, being contagious. Indeed this supposition is corroborated, and rendered highly probable, by attending to the origin and mode of spreading of the disease in an army. The French army, it appears from all accounts, suffered as much or more from ophthalmia in Egypt than ours. The disease accompanied it to France, and is not, I believe, as yet eradicated from it.

Though I have gone thus far in endeavouring to establish an Egyptian origin for the violent species of ophthalmia, which has latterly excited so much attention, still I can see no reason why a violent inflammation of the eyes should not take place occasionally in other countries. I fear the fashion of putting down the ophthalmia observed in Egypt as a disease *sui generis*, and of considering it as different from every other inflammation of the eye, met with in Europe, has had some share in disturbing our opinions as to the true nature of the disease, and consequently in leading us away from a right method of treating it. As its inflammatory nature is now ascertained beyond a doubt, and as it resembles in every respect any other violent inflammation of the eyes, in the production of which the climate or contagion of Egypt could have had no share, I see no advantage in giving it the denomination of "Egyptian ophthalmia," or in allotting to it a separate consideration. We find the same disease of other organs often produced by various separate causes; but as long as the method of cure is not affected by the nature of the cause, I see no necessity for combining the name of the cause with that of the disease. Now the disease which has been called Egyptian ophthalmia, is to be treated precisely in the same way as any other violent inflammation of the eyes. No one acquainted with the history of Egypt, or with the recent campaigns of European armies in that country, will dispute the frequent occurrence of a violent species of ophthalmia in that country; but it appears to me that this very circumstance has eclipsed others of a minor consideration, and laid the foundation of error. Almost every modern writer, whether French or Italian, and perhaps I might add, English, whom I have consulted on the subject of Egyptian ophthalmia, represents the disease in its most violent shape; from which one would be led to infer, that there was no such thing as a mild form of ophthalmia in Egypt. Now, I can take upon myself to say, that I have met with a great number of cases of ophthalmia in that country, in which the inflammation was by no means high, not higher indeed than in the ordinary mild ophthalmia in England, and in which that symptom yielded to the usual collyria and blisters to the temples. It appears then, from this fact alone, that the general denomination of Egyptian ophthalmia ought to imply two species of the disease; and that it leads into error when it is confined to the representation of one of a violently inflammatory nature. Influenced by these views of this subject, I do not intend giving a separate account of ophthalmia as it appears in Egypt; but I shall endeavour to mark, in the divisions of the disease which I adopt, every peculiarity of cause and modification of symptoms attending the disease in that country.

Among the numerous species of ophthalmia pointed out, one is said to be produced by the introduction of the matter of gonorrhæa into the eye, or by that disease being repelled; and the inflammation is represented as assuming an extraordinary degree of violence, when arising from these causes. I cannot dispute the authenticity of this assertion; but I know to a certainty, that a single case of the kind has not presented itself to me, in the whole course of my experience, among persons in whom from their habits and negligence it might be expected. I have had repeatedly patients under my care, who laboured under both gonorrhœa and ophthalmia, without being able to trace any connection between these complaints, or having observed that the inflammation of the eyes was particularly violent in such cases. In many cases the inflammation of the eye yielded to the simplest means, and in no case has it run very high, or been attended by the purulent discharge from the eye, which is said to be characteristic of that species of ophthalmia. Two or three patients labouring under ophthalmia and gonorrhœa got swelled testicles, accompanied by a cessation of the discharge from the urethra, and I did not find that the affection of the eye was in the slightest manner influenced by this event.

Before entering on the history of ophthalmia, it may not be amiss to take a cursory view of the habits of life and peculiarity of situation of the persons, who, as far as my experience goes, were the subjects of the disease, and those from whom my observations were taken. In doing so, I hope to afford some illustration of the causes of ophthalmia in soldiers, and to account in some degree for the extreme violence it manifests in persons of this description.

The soldier is necessarily exposed in times of active service to the full influence of every climate in which he happens to serve. The necessity of situation, and often the strictness of military discipline, precludes the possibility of his accommodating his manner of living or clothing to the climate he inhabits, or the particular service on which he is engaged. Besides these inevitable disadvantages, he is often improvident and careless of the future, and unfortunately the circumstances or practices of the service, do not place him under the necessity of correcting these defects. As it must be a primary object in the army to have the soldier always ready and fit for service, the shortest and most effectual means are taken for accomplishing this. He is not allowed to procure food and raiment for himself, lest in his habitual prodigality he should consume the funds allotted to this purpose. His officer takes to himself the charge of providing him with these necessary articles of life. He is not allowed to act, I might say to think for himself, lest the freedom of thought or of action should interfere with his obedience as a soldier. In a word, he has little of the employment, and none of the wants or cares, which conduce to reflection and circumspection of conduct. He fears nothing but his officer's displeasure, and the heavy punishment annexed to military misdemeanours. By the heavy hand of military discipline only is he kept in order and in awe; and when he fancies he can escape this, as is almost natural to expect, he revels in the pursuits and enjoyments from which he was restrained.

The British soldier, I am sorry to have occasion to say, is too prone to indulgence in the excessive use of intoxicating liquors. This vice, independently of the direct injury it does to his health, and the series of moral evils it brings in its train, exposes him to many causes of disease. He often sleeps abroad in a state of intoxication, exposed to noxious exhalations, to the meridian sun, or the chilling air of the night; and if he be fortunate enough to escape confinement in the guard-house for this offence, he is consigned to his tent or quarters, there to await returning sobriety. As soon as the state of intoxication is passed, he is put on some laborious duty, handed over to the drill-serjeant, or perhaps treated still more roughly, in order to make atonement for his irregularity. The repetition of excesses and practices of this kind, must shake the constitution of the strongest man; but if the soldier happen to be naturally delicate, or have a predisposition to any disease, nothing is more likely to ruin his health, or call forth the disorder, the germs of which already existed in his constitution. Accordingly we find that pneumonia, dysentery, rheumatism, phthisis pulmonalis, and a long list of other complaints, are produced in this way. Intemperance, it is well known, is prejudicial to health in all countries, but it is particularly destructive in warm climates.

When the unfortunate soldier is attacked with any disease that reduces suddenly his strength, or causes him much pain and suffering, he requests to be sent immediately to hospital; but if his ailment be ophthalmia, which arises as often as any other from his carelessness and excesses, as he does not feel any general sickness, he seldom reports his complaint to a military or medical officer, until he feels some serious inconvenience. He can often go about, and even do his duty in the incipient state of his disease, and it sometimes happens that a day or more passes over in this way, before the inflammation of his eyes attracts attention. This time he usually spends on guard, or some other duty or employment equally unfavourable to the state of his eyes; and when it is at last found necessary to send him to hospital, finding his appetite good, and feeling no aversion to wine, he frequently drinks as much of it as he can procure on his way from his quarters to the hospital.

Under circumstances such as these, I suppose it will be readily conceived that an inflammation in the eyes of soldiers must often attain a great height before it comes under the management of the medical officer; and that the organ concerned, from the nature of its structure and the effect of inflammation on it, must often suffer irreparable injury. I have had the mortification to see more than once patients with ophthalmia admitted into hospital in a state of intoxication, in whom the eye suppurated before a state of sobriety had returned.

It is an opinion entertained by many officers, both military and medical, that soldiers produce ophthalmia in themselves, with the intention, it is said, of causing blindness, or such imperfection of sight as will render them unfit for the service. Though this may be the case in some rare instances of vile cowards, and senseless unfeeling wretches, I have every reason to think that it rarely occurs in the British army. I have now had under my care some thousands of ophthalmic patients, and I must confess that, though I have used a vigilance sharpened by a bias towards that opinion, I

I have not as yet been able to make out, clearly, a case in which the soldier produced the disease in himself by improper means, or even intentionally aggravated its violence. I am sorry, however, to have another charge, of a serious nature, to make against some of my patients, by declaring that many of them have ignorantly, and, I am sure, unintentionally, injured themselves most materially by not only neglecting my instructions, but by indulging, at the very height of the disease, in the intemperate use of intoxicating liquors. Some patients, and these very few in number, were foolish enough to substitute a treatment of their own for that ordered by me. This irregularity I found, generally, to consist of the introduction of powdered alum or sugar into the eye; and I have every reason to believe that it was had recourse to with a view of saving, not of destroying the eye. Now many men, much more capable than the uncultivated private soldier, of appreciating the advantages of good medical advice, slight the sagest doctors, and the wisest counsel, and treat their diseases according to their own disordered imagination, or commit themselves to the hands of empiricks.

It may be asserted, that gross irregularities, such as I have just stated, could not take place under a proper system of hospital management. It is not for me to determine how far this allegation is founded in truth. I shall only beg leave to remind those who maintain it, that an hospital for ophthalmic patients solely, presents some peculiarities which require to be well weighed before censure is passed on the medical men in charge of such an establishment. In the ophthalmic hospitals under my care, both in Egypt and Sicily, I had usually from 100 to 150 patients, or more. Some of these were necessarily convalescent, and most of the remainder, though labouring under a greater or less degree of inflammation of the eyes, felt no loss of strength or want of appetite, and were, indeed, nearly free from those sickly feelings which accompany the diseases of most other patients who are judged fit subjects for a general hospital. Such men, possessing no resources within themselves—leading a life of indolence and restraint—suffering nothing of what in their minds constitutes sickness—totally unacquainted with the nature of their disease, and, of course, unapprehensive of its results, were in a state, of all others, the most likely to induce them to neglect or make little of medical advice, as well as to give birth to the desire of indulging in their favourite propensities. It will, I apprehend, be admitted, that it requires no small share of vigilance and activity to keep patients, so circumstanced, in proper order. For my part, it is with much concern I am obliged to state here, that neither the fear of severe punishment, inflicted occasionally on the least pardonable transgressors, nor the vigilance of the medical officers * and hospital attendants, who resided in the hospital, was sufficient to effect this purpose. The patients who undertook to procure wine, or any other article not allowed to be conveyed into the hospital, clandestinely, exposed themselves to numerous causes of evil. As they could not escape from the hospital by day, they were obliged to carry their wicked schemes into execution in the dead of the night, by which they were exposed to the night air and fatigue, and were deprived of their rest; and as the love of wine was at the bottom of all their wickedness, there can be little doubt of their having indulged pretty freely in the use of it. An irregularity of this kind occurring now and then, would not deserve much notice. It is the frequency of it, and the difficulty of correcting it, that constitute the crime.

It is distressing to be obliged to institute so grievous a charge as that of intemperance, and an intemperance too under the least excusable circumstances, against any part of our army; but I am reluctantly compelled to do so from a perfect knowledge of the enormity of the practice, and from a thorough conviction of its effect in producing and aggravating the disease in question,

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* It is due to the merit and professional abilities of Mr. E. Black, assistant surgeon, 10th Foot, who shared the labours of the ophthalmic hospital with me for more than two years, to state, that he discharged the duties of his station with zeal, steadiness, and ability.

and I might add many others. It would not be difficult to trace the effects of intemperance in soldiers in warm climates, from the disordered stomach and slight head ache, to a diseased state of the liver, or other abdominal viscera, and general dropsy; or until the constitution was so shattered that no function of the body was performed in a healthy manner, and premature old age and infirmity were brought on. I do not mean, however, to assert that all soldiers are so destitute of a sense of duty and propriety as to give themselves up to intemperance. All I mean to inculcate, is, that a certain proportion of them, by doing so, bring disease on themselves; and I entertain the most sanguine hopes that this public avowal of the fact will have some effect in bringing about the suppression of a practice so prejudicial to the health, so unfavourable to the duty, and so derogatory to the character of a soldier.

PART I.

OF OPHTHALMIA.

Nosologists generally point out several species of ophthalmia, giving an appellation to each taken from the part of the eye affected with inflammation. Some late writers have divided the disease into several varieties, and given a name to each, deduced from the prevailing symptoms or supposed causes. For my part, without at all pretending to question the arrangements of others, I shall adopt a division of the disease into varieties, founded on the degree of violence and character of its symptoms; and I do this more with a view of enabling me to propose a fixed and precise mode of treatment for each variety, than of attempting any radical distinctions as to the forms of the disease, or of following it through its transitions from one state to another. Three species of ophthalmia, viz. two of an acute inflammatory type, and one of a chronic nature, may then be pointed out according to this view of the subject. But the two first, though resembling one another in the leading feature of acute inflammation, still present such difference in the number and violence of their symptoms, run such different courses, and require so different modes of treatment, that it will be necessary to consider them under separate heads. In conformity to this plan, then, one species of the acute kind may be denominated *ophthalmia mitis*, or the mild ophthalmia, and the other, *ophthalmia gravis*, or the virulent ophthalmia. The chronic species, though it is difficult to ascertain, with precision, the point at which it begins, and though it presents some variety in its appearance, is still sufficiently well marked in its aspect to admit of being described under one denomination.

I shall, therefore, proceed to make some observations on each species of ophthalmia included in the above division.

CHAPTER I.

Of Ophthalmia Mitis.

The first symptoms usually observable in this variety of the disease are a sense of heat and itching of the eye. These are generally succeeded by an increased secretion of tears, which, by being diffused over the cornea, alter the refraction of the rays of light, and thus cause some indistinctness of vision. These symptoms are soon followed by more or less pain, and intolerance of light. Sometimes both eyes are affected at once; but more commonly the disease appears first in one eye, and passes to the other. Cases, however, occasionally occur, in which the inflammation runs its course in one eye, without the other being at all affected. Often a sense of roughness of the eye ball, or a pain in one spot of the eye, as if arising from the irritation of a moat or grain of sand, is the first indication of the disease. On looking under the eye-lids, in these cases, a small plexus of red vessels is seen running in the direction of the pained part. It not unfrequently happens, that the pain is first felt in one point of the tarsus, and a small ulcer, or tumefaction, is found at that particular spot. After these symptoms have continued some time, the eye-lids are generally drawn closer together, the pain becomes more acute, the intolerance of light increases, and the secretion of tears becomes more copious. On examining the eye in this stage of the disease, the caruncula lachrymalis is often a little swelled, but is always redder than natural; the tunica conjunctiva is found more or less injected with red vessels, some of which run to the very verge of the cornea, and the edges of the palpebræ are redder than natural. The pulse, or natural functions, are seldom disturbed, unless in cases of very delicate persons, and there is rarely any head-ache, or soreness of the integuments of the head.

It will appear from the preceding account, that this form of the disease is the one with which most practitioners in private life are conversant, as it corresponds pretty much with their description of ophthalmia. I have met several instances of it in the army in Egypt and Sicily. It is, however, a much more frequent occurrence in the latter than in the former country. Did it not form a large proportion of the cases in the army, I fear that ophthalmia would incapacitate more men for the service than all the diseases of the army put together.

The inflammation, and other symptoms, vary in degree from a slight redness, watering and uneasiness of the eye, to that of acute pain, intolerance of light, and copious secretion of tears. It never terminates, as far as I know, in a suppuration of the cornea, or any part of the eye. By mismanagement however, in the treatment of it, or by the continued application, or the combined action of some of the most powerful of its existing causes, it sometimes passes into the virulent or chronic state, the consideration of which belongs to another place. The inflammation may last for a week, or even longer, but it generally gives way to proper treatment in the course of a few days.

This variety of the disease is produced by exposure to high winds, especially if they are cold and damp; by too great exercise of the eye; by the action of smoke, dust, and other irritating substances on the eye; by long exposure to the glare of the sun; but it is most commonly produced by cold, or vicissitudes from hot to cold, and is often accompanied by catarrhal symptoms.

TREATMENT.

The great object is to subdue the topical inflammation of the eye. This may be done, in a great number of cases, by removing the patient from the sphere of action of the existing causes; by putting him on a low and cooling diet; by confining him in a well ventilated room, from which the light is excluded; by opening the bowels with saline purgatives; and by keeping the eye moist and cool with a weak solution of cerussa acetata, a mixture of vinegar and water, or even cold water. If the inflammation, however, do not speedily yield to these means, it will be necessary to bring into their assistance the application of leeches to the temples, after which, blisters are to be applied, if necessary, in succession to the temples, behind the ears, and to the nape of the neck. I have seldom met with a case in which the inflammation did not yield to these means. When, however, the inflammatory symptoms run high from the beginning, or prove obstinate and tedious, I would recommend taking eight or ten ounces of blood from one of the branches of the temporal artery. This will be found productive of the most marked and decisive benefit. Patients are often unwilling to submit to this operation, and medical men are not forward in recommending it; but I am fully persuaded that it is by far the most speedy and effectual, and, perhaps, the least productive of pain of any active remedy hitherto employed in this disease.

The conjunctiva sometimes remains injected with red vessels after the inflammation has ceased. This symptom usually gives way to a solution of sulphate of zinc, in the proportion of one or two grains of the sulphate to the ounce of water. This is to be used as a collyrium several times in the course of the day. Another mode of removing this symptom consists in dividing the red vessels with a small scalpel, or the shoulder of a lancet. This may be also had recourse to in conjunction with the use of the collyrium of sulphate of zinc.

I am well aware that some persons commence the treatment of this species of ophthalmia by dividing the vessels of the conjunctiva, and using, from the beginning, astringent or stimulant collyria. This practice is strongly recommended by some medical men in the army in the Mediterranean, who have had excellent opportunities of observing its effects; and from their accounts of it, I am perfectly satisfied that it is often successful. I have no hesitation, however, as far as my experience goes, to give a decided preference to the former method of treatment. The latter, I have many reasons to think, is by no means so certain or efficacious as the former, as it is not unusual to see the inflammation pass into the chronic state in cases in which it has been used. Besides, it does not appear to me to effect a resolution of the inflammation in so short a time as the other; and I have sometimes observed that the first effect of it was a considerable augmentation of all the symptoms of the disease.

Another mode of treating this species of ophthalmia, consists in having recourse to astringent and stimulant collyria, without emptying the vessels of the conjunctiva by dividing them, or reducing the inflammation by leeches or the application of blisters to the temples or parts in the neighbourhood of the eye. This practice appears to me to be injudicious in every point of view, and will, I fear, increase the inflammation, and be productive of other kinds of mischief in a great majority of the cases in which it is used.

The patient, as soon as he is convalescent from this disease, must be cautious, for some time, not to expose his eyes to a vivid light, or, indeed, to any cause of irritation. It will be necessary for him also to avoid scrupulously cold, fatigue, night-air, and, indeed, every cause of the disease, until the healthy state of the eye is perfectly restored.

CHAPTER II.

Of Ophthalmia Gravis.[*]

All the symptoms enumerated in the ophthalmia mitis are present in this variety of the disease, but they exhibit a much greater degree of violence. The inflammation generally begins in the outer coats of the eye, and extends to the iris, retina, and other parts; but cases occasionally occur, in which there is reason to suspect, that the inflammation commences in the interior of the eye, and extends to the exterior. These are, however, exceedingly rare; and when they do occur, I am disposed to think the inflammation generally produces an opacity of the lens, or a derangement in the structure or position of the humours of the eye, which occasions blindness. In a few cases in which I thought the inflammation commenced in the interior of the eye, I observed that the pupil was closed like the mouth of a purse, and it never afterwards acquired the power of dilating.

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[*] I had at one time determined on dividing the subject of this chapter into various sections; but on a closer view of that mode of proceeding, I found that it would necessarily lead to tiresome repetitions. The derangements in the structure of the cornea, and the affections of the iris and humours of the eye, which I am obliged, by adopting the present plan, to consider as symptoms only of ophthalmia, are put down as distinct diseases by others. In order, however, to avoid confusion and obscurity in the arrangement which I adopt, I shall endeavour to follow and describe the symptoms in the order in which they appear from the beginning to the termination of the disease; and to institute a method of cure calculated in the first instance to subdue the inflammation, and when that has not been accomplished, to save the eye from total destruction.

Sometimes one eye only is affected, but much oftener both are inflamed from the beginning. I have seen cases in which the inflammation was confined to, and ran its course in one eye, without any affection of the other. Such were, however, very rare. It is not unusual to find the inflammation become more moderate after extending from one eye to the other, especially if some time elapse from the attack of the one to that of the other. It would appear that the force of the inflammation is diminished by being divided between both eyes. Sometimes as soon as the inflammation begins to abate in one eye, it appears in the other; and it is occasionally observed, that it reaches suddenly from one eye (leaving, however, always some watering, redness, and tenderness of the eye) and as suddenly appears in the other. These may be considered as deviations from the regular appearance of the disease, as that is in general found to consist of a steady and intense inflammation of both eyes. It matters little, except in respect to prognosis, whether the inflammation commence in the external or internal parts of the eye. When the disease is at its height, every part within the orbit, and even the palpebræ, are in a state of violent inflammation.

The conjunctiva in the early stage of this disorder is red, swelled and turgid. The secretion of tears is copious. I have never met with a case in which this symptom was absent. The patient complains of excessive pain and roughness of the ball of his eye, and he cannot bear even a feeble light. The eye-lids are red at their edges, and swelled, and there is often a sense of weight and scalding of the eye. Sometimes the integuments of the forehead and temples are red, swelled, and painful; or there is a soreness of the integuments of the whole head, with head-ache, a hard quick pulse, rigors, and other symptoms of fever. In almost all cases there is pain shooting across the forehead or along the temples. To these symptoms succeed in a very short time, odematous swelling and tension of the eye-lids, and prodigious tumefaction and turgescence of the conjunctiva, with a feeling as if the eye was to burst out of the head. If a ray of light now fall on the retina, the patient stoops his head with extraordinary celerity, covers his eye with his hand, and describes his feeling as if some sharp instrument was thrust into his eye, or as if something of a red colour darted through it. The eye-lids are painful to the touch, and the force necessary to use in opening them causes much distress. The coats of the eye being now enormously inflamed, distended and tense, and the eye-lids, and very probably the lachrymal glands, and every part contained within the orbit, being in a similar state, the globe of the eye must be greatly pressed, and its motion in the socket rendered difficult and painful. The muscles which move the eye, being themselves inflamed, are rendered highly irritable by this circumstance, and act with redoubled force on the ball of the eye. This violent action of the muscles is, no doubt, a source of pain in itself, as far as the muscles are concerned; but the violence of the action on the inflamed and distended ball of the eye, already pressed by the swollen parts within the orbit, must cause a lancinating pain in every motion of the globe of the eye. As the muscles of the eye are almost always put in motion by the impression of light on the retina, on a person's coming from a dark place into the light, I think it probable that a portion of the excruciating pain following the impression of light on the retina in the case of violent inflammation, is owing to the violent action of the muscles on the ball of the eye, and to the difficulty of its motion in the orbit. In addition to all these causes of pain, it may be observed that the inflamed parts are chiefly membranous, or of an extremely delicate texture; and that inflammation in such parts runs a particular course, and is attended with most exquisite pain. I may further add, that an affection of the eye, from the importance of the organ, and from the prevailing opinion among mankind of its being the most delicate and tender part of the human frame, causes much mental distress.

In some cases the under eye-lids are turned outwards, in others both eye-lids are closed, and swollen, and the skin of these parts has an efflorescent, shining appearance. It is not unusual to see the eye-lids open, and the conjunctiva so much swelled and turgid as to protrude from the eye in the form of two or three folds. The tarsi in these cases are necessarily separated from one another, and the tumefied conjunctiva fills the whole anterior part of the space between the eye-lids, so that it is not possible to obtain, by any means, a sight of the cornea, or other parts of the globe of the eye. When, however, the tumefaction of the conjunctiva is not so great, and the eye can be brought fully into view, the cornea appears sometimes to be unusually pellucid; the pupil is contracted; the iris is discoloured, or, as it were, full of spots, and I have often thought that it was forced nearer to the cornea than it is observed to be in the healthy state of the eye.

If the inflammation be now allowed to continue some time longer, a secretion of a purulent like matter takes place from the surface of the conjunctiva and glands of the tarsi. This matter is pent up for some time within the eye-lids, in cases in which the tarsi come in contact; and in others where these are separated, it flows out of the eye mixed with the tears. It is so acrid as to irritate the eye exceedingly, and to excoriate the palpebræ and cheeks in passing over them. The sufferings of the patient in this stage of the disease are excessive. He describes his feelings as if boiling water was poured into his eyes. He is hot and feverish. He can get no sleep by night or day; nor can he remain long in any one posture or situation. Bleeding from the temporal artery, large doses of opium, and washing the acrid matter repeatedly from the eye, will bring slight relief in most cases; but in others, no topical application or internal remedy will alleviate the sufferings of the patient, and he at last becomes delirious. If a sight of the ball of the eye can be now obtained, it is found bathed with the purulent matter; a groove or depression, filled with this matter, runs round the whole circumference of the cornea; and the cornea itself is muddy in a part or the whole of its extent, or its surface is studded with small white spots. These appearances are unfortunately the commencement of a suppuration of the cornea, and when the disease has got this length, the muddiness partial or general of the cornea increases, or the white spots increase in size, or run into one another, and a suppuration of the cornea to a greater or less extent always takes place. The muddiness in these cases, is owing to the effusion of lymph in the substance of the cornea, and when this extends over the whole or a part of the cornea, it is not unusual to see an abscess result, equal in extent to the muddiness. The white spots are owing to the same cause, and always prove to be the seat of abscesses. Sometimes, ~~then~~, the whole of the cornea is included in the suppuration and destroyed; the iris is laid bare, the lens and vitreous humours are forced forwards on the iris, or entirely evacuated, and even the form of the eye does not remain. At other times, a portion only of the cornea suppurates, and the sight is more or less affected afterwards, according to the point at which the suppuration has taken place, and the extent to which it has gone. If the abscess be situated before the pupil, and if it penetrate the whole depth of the cornea, the aqueous humour, in escaping, will carry with it a portion of the iris through the aperture in the cornea, and the pupil will be generally totally obliterated by the protrusion of the iris, and its subsequent adhesion to the sides of the ruptured cornea. It not unfrequently happens however, that a suppuration of the cornea, penetrating also its whole depth, takes place at a point nearer its circumference than center; and in such cases it rarely happens, that the pupil is obliterated, as a small portion only of the iris, and that at some distance from the pupil, protrudes. I suppose it is unnecessary to observe that the cornea collapses in all these cases, on account of the escape of the aqueous humour, and that the eye loses its rotundity for a time. When the aqueous humour is regenerated, and the eye regains its natural form, the pupil is found to deviate more or less from the circular form, and vision is rendered more or less imperfect according to the injury done to the pupil. It is surprising, however, how little the sight is affected by the protrusion and subsequent adhesion to the cornea of a considerable portion of the iris, provided the pupil be not included; and how forcibly nature afterwards endeavours to bring the pupil to its natural form. I have seen some cases in which the iris protruded at three parts of the cornea, and the pupil had a very irregular form; and many others in which it protruded at two points, and the pupil had an oblong form, sometimes in a transverse, at other times in a perpendicular direction, and yet vision was nearly as perfect in all these cases as before this derangement of the pupil took place. Generally no more of the iris protrudes after the bursting of the cornea than the portion at first carried out by the aqueous humour; but in some melancholy instances it continues to protrude from time to time, until the pupil is totally destroyed, or reduced to such a size that a glimmering only remains. This sad event seems to be owing to an adhesion not forming speedily between the iris and the cornea, by which the aqueous humour, when it is regenerated in any quantity, escapes through the wound, and carries with it at each time an additional portion of the iris.

In the disastrous cases in which the whole eye is destroyed, the humours are generally evacuated in a violent paroxysm of pain. In cases of partial suppurations of the cornea, the patient feels at the moment of the escape of the aqueous humour, as if something in his eye gave way, or as if fire was knocked out of it by a blow. The escape of the aqueous humour, and the protrusion of a portion of the iris, events apparently so much to be dreaded, are followed by an abatement of the sufferings of the patient. The tension of the eye, and of all parts within the orbit, and even that of the eyelids, is considerably diminished by this circumstance. The inflammation of the eye begins to decline from this moment, and the state of the eye to improve, unless in the melancholy instances in which the iris continues to protrude. The constriction, however, of the tender iris,* and its exposure to the air, tears, and acrid secretions of the eye, as well as to the motion and friction of the eye-lids, keep up still considerable inflammation of the eye, and cause much suffering. This is always the case for several days after the protrusion of the iris; but the pain and inflammation decline gradually; and if the little eminence on the cornea be not destroyed by caustic, or removed by a cut of a scissars, it becomes covered in time by a membranous or horny substance like the cornea, by which it is protected from the air and tears, and the patient ceases to feel any inconvenience from it.

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* I do not mean to infer that the cornea possesses a contractile power. The constriction of the iris is occasioned by the inflammation and consequent accumulation of fluids in the protruded portion, by which it is pressed against the sides of the wound in the unyielding cornea.

In some few instances it appeared to me that the protruded portion of the iris was contained in a membranous sack. I was led to suspect that this was the case, from having observed in some instances of protrusion, especially when the iris protruded near the junction of the cornea with the sclerotica, that the eye preserved nearly its natural rotundity and size; but that the aqueous humour escaped, and the cornea collapsed by touching the little eminence with caustic, for the purpose of destroying it. It appears to me that the first effect of the caustic in these cases was the corrosion of the membrane, which restrained the flow of the aqueous humour, and contained the protruded portion of iris. I have repeatedly observed that the aqueous humour escaped, and the cornea collapsed in cases of protrusions of this kind, from the patient's being attacked by a violent fit of coughing, or a new accession of inflammation. After having noticed these facts for some time, I resolved to pay close attention to every case of protrusion of the iris, in which the aqueous humour had not escaped, nor the cornea collapsed; and I uniformly found that the little eminence formed by the iris, was seated near the circumference of the cornea; and that it was not as sensible to the touch, or productive of as much pain from the friction of the eye-lids, and irritation of the air and tears, as when the iris was bare. I also found, that when the membrane gave way, in consequence of corrosion by caustic, or of violent straining of the eye in a fit of coughing, the iris protruded in greater quantity, and the sufferings of the patient, arising from the exposure and friction of the iris, increased.

Sometimes, the suppuration of the cornea does not penetrate its whole depth, and an ulceration or depression on its surface, is the consequence. The ulcer, in some cases, penetrates deeper, and brings about the escape of the aqueous humour with its concomitant symptoms; and in others is filled up with more or less opaque matter, rendering vision more or less imperfect, according to its extent, and the degree of opacity accompanying its cicatrization, if it happen to be situated before the pupil.

Ulcers of the cornea are sometimes so numerous as to render its surface uneven. They differ much in form and aspect. When they are produced by a high degree of inflammation, they are in general large and deep. Sometimes they are small, round and deep; at other times they are irregular and deep; and often they are extensive and superficial, consisting of the removal of a portion of one or two lamellæ of the cornea. They are produced by inflammation, and they are themselves a cause of keeping up that symptom; and a fertile source of suffering and danger to the patient. They are much more prone to spread and penetrate deeper in some persons than in others; and they are often not filled up for a year or more after their formation; nay, I have reason to suspect that they are not filled up to the level of the cornea, in some cases, for a great length of time. Sometimes, however, the ulcer is speedily filled up with very opaque matter, which rises above the level of the cornea, and forms a prominence of the colour of pearl. If an ulcer of this kind, and the cicatrix which ensues, be situated before the pupil, vision will be necessarily obstructed. It rarely happens that any red vessels are seen running to the ulcers formed in this variety of ophthalmia, for several days after their first appearance. If the ulcer be situated near the tunica sclerotica, red vessels shoot into it in a very short time; but if it be situated in the center of the cornea, a considerable time elapses before any red vessel extends to it.

I have sometimes observed small aqueous vesicles in various parts of the cornea, but most commonly in the site of ulcers, near its junction with the sclerotica. These ulcers, notwithstanding what many writers assert to the contrary, appear to me to be formed by the aqueous humour contained in a pellucid membrane. I have punctured several of them, and have uniformly found that the aqueous humour escaped, and the cornea collapsed. I do not pretend to determine whether the membrane which contains the water in this case, and the protruded portion of iris in the other just alluded to, be what anatomists have called the tunic of the aqueous humour, or an internal lamina of the cornea. The aqueous vesicle is represented by some writers as being formed by the vitreous humour. This may be the case, no doubt, in some instances; but I have seen vesicles of this kind rise from the bottom of ulcers, or appear just in the center of an ulcer which had been nearly filled up, in cases in which not a single drop of the aqueous humour had escaped, and where consequently the vesicle could not have been formed by the vitreous humour. When the vesicle appears in an ulcer in which the process of cicatrization is considerably advanced, a small transparent point is seen exactly in the center of the opaque spot, which to a person who views it superficially, appears to be a hole about the size of a pin's head.

The conjunctiva, besides being swelled and inflamed, has, in many cases, numerous ulcerated points on its surface, particularly on that part of it which covers the tunica sclerotica. When the inflammation and purulent discharge continue for some time, the surface of the conjunctiva acquires a vitriol-like appearance, or it is covered with a fungous growth.

Swelling and turgescence of the conjunctiva are sometimes among the first symptoms of this variety of the disease. The discharge of a puriform matter from this membrane and the glands of the tarsi, though it occurs in a very large proportion of cases, is not however a constant symptom. When there is no purulent discharge, the swelling of the eye appears as if it was occasioned by the effusion of serum, or rather a glairy fluid under the conjunctiva. No water, notwithstanding, is let out by puncturing this membrane. The sufferings and danger of the patient's losing his eye, are usually less in cases of this sort than in those attended with a purulent discharge. I have seen cases of this kind in which the patient complained but little of pain, and could bear the light without much inconvenience. A large suppuration of the cornea is not to be dreaded under these circumstances; but vision is rendered frequently very imperfect by large superficial ulcers of the cornea. As there is evidently an effusion of serum under the conjunctiva lining the eye-lids and covering the sclerotica, so it seems to me that there is also an effusion of serum under that portion of the conjunctiva which passes over the anterior surface of the cornea. This membrane being thus detached from the subjacent parts, a portion of it sloughs off, and a large superficial ulcer of the cornea remains, which takes a long time to fill up.

I may observe here, that the pain attending this disease, though it is a predominant symptom, has sometimes intermissions in its most violent forms. I am disposed to believe that pain is never entirely absent, but that what is called a cessation of pain is nothing more than a diminution, which by the ease it brings, is mistaken for a total cessation of pain. In this way, the pain frequently becomes moderate in the course of the day, but setting in pretty sharply in the evening, rises to an excruciating degree in the night, and the cornea is often found suppurated to a greater or less extent in the morning. It is important to be acquainted with this fact, as there is no trusting to the efforts of nature to remove the disease, as long as the other symptoms of inflammation are present.

The period at which the suppuration of the cornea takes place is various. Sometimes it comes on in 30 or 48 hours after the attack of inflammation; but often not for three or four days, or even longer. In cases of very violent inflammation in the summer season, suppuration may come on in 24 hours after the full establishment of the inflammatory symptoms. The purulent secretion from the glands of the tarsi and surface of the conjunctiva, is by no means uniform in the periods of its appearance. Sometimes it is an early symptom, and at others it does not come on for two or three days after the attack of inflammation. This secretion is more abundant, and apparently of a more acrid quality in some persons, especially in those of a scrofulous habit of body, than in others. It is a great source of irritation to the eye, and by being pent up within the palpebræ, it causes much suffering to the patient, and hastens the suppuration of the cornea. When this discharge is abundant, the cornea, whether owing to a diseased action in itself, or to the action of this matter on it or to both, becomes dim, even when all danger of its suppurating is past. A close examination of it in this state gives an idea of its being softened in its texture and rendered thicker. The appearance of this discharge does not indicate any diminution of the inflammation. I have seen the whole cornea corroded or consumed in one night, in cases attended with a copious secretion of this matter.

The vessels and coats of the eye are so enfeebled and relaxed by the violent inflammation in this species of the disease, that though we may be able by rigorous treatment to prevent suppuration, still we cannot by any means in our power prevent its passing into the chronic state, in some few cases. It might be supposed that the tender retina would be so much injured by so violent a degree of inflammation, that its sensibility to the impression of light would be destroyed. I have met, however, with more than two or three cases in which the disease terminated in amaurosis of one eye. I have seen no case in which it produced amaurosis of both eyes.

The course which I have now described is that which this disease usually runs, when left to itself. It occasionally, however, presents other symptoms, with which it is equally necessary to be acquainted. Sometimes purulent matter is deposited in the anterior chamber of the aqueous humour. This matter is generally taken up by absorption; but I have now and then seen it discharged through an aperture in the cornea. I have never seen it effluxed in such quantity as to distend the eye, and render it necessary to puncture the cornea in order to let it flow out. It generally assumes a semilunar form at the bottom of the aqueous humour in the anterior chamber of the eye. In some cases the lens becomes opaque, in others the opacity seems to be confined to the capsule. Sometimes an adhesion is formed between the posterior part of the iris and the capsule of the lens; or a tumour formed in the iris, which reaches to the cornea and lens and adheres to them. I may observe in this place, that diseased affections of the iris are much more frequent in this species of ophthalmia than I have reason to think they are supposed to be, from seeing so little mention made of them by writers on the diseases of the eye. If the iris be examined closely in most cases of violent inflammation of the eye, the pupil will be found to be more or less irregular in form. Small tumours in the substance of the iris are by no means unfrequent occurrences. I have sometimes seen these so large as to press on the cornea, and make it project at a particular point. I have no satisfactory idea of what the nature of these tumours may be; but from seeing them frequently in cases in which purulent matter was effused into the aqueous humour, I have suspected them to be abscesses. They always disappear in time, leaving, however, a slight irregularity in the form of the pupil, which continues for a long time, and does not injure the sight in the smallest degree; or they cause an adhesion to take place between the iris and lens or cornea, by which vision is more or less injured, if not totally lost. I have observed these tumours of the iris more frequently in persons of a scrofulous diathesis than in others. They are always accompanied with great pain, watering, and intolerance of light. In one case, two points of the edges of the pupil were brought into contact by a tumour of this kind. The iris adhered at these points, and when the tumour disappeared, the pupil was divided into two parts by a line across it; yet the person could see pretty distinctly.

Sometimes blood is effused into the aqueous humour, and the cornea assumes a purple colour. It is seldom effused in such quantity as to produce inconveniences; and it is in general taken up by absorption. In some cases the lens is forced forwards on the iris. In others the iris is brought forwards on the cornea, and the eye has a singular appearance from the iris lying close to the inner side of the cornea. An adhesion in these cases between the lens, iris, and cornea takes place, and the sight is irrecoverably lost. I have often suspected that the inflammation commenced in the interior of the eye in cases of this kind. It is somewhat singular that almost all the cases of this latter description, which have fallen under my observation, had been under the care of others for weeks before I saw them.

Having now given as full, and at the same time as correct an account of the symptoms of this species of ophthalmia, as it is in my power to communicate, it remains for me to observe, that cases of it occasionally occur, in which the inflammatory symptoms are not so violent, nor the sufferings of the patient so great, as I have represented them. That this comparatively less violent state of the disease belongs, however, to the virulent species of ophthalmia, will, I conclude, be admitted from the circumstance of its being attended by a degree of inflammation, sufficient to bring about the destruction of the eye by a suppuration of the cornea. It will be necessary, therefore, to keep this remark in view in the cure of the disease, not for the purpose however of changing the principle, but of modifying it and suiting it to the state of the case.

It will, I suppose, be readily perceived that the variety of the disease, which I have now endeavoured to describe, as it is by far the most violent in its symptoms and destructive in its consequences, is that which by way of distinction has been called " Egyptian ophthalmia." I have not adopted this title for the reasons already alledged; but I am willing to allow, that if the frequency of a particular disease in any one country gives a right to a special denomination, no name was ever more justly applied. The marks of the disease in the eyes of the inhabitants of Egypt are evident to the most superficial observers. Its prevalence in our armies in that country will, I believe, be allowed by both officer and soldier to have been alarming and distressing. I wish I could state, from my own experience, in the treatment of the disease, and from what I saw of the practice of others, that our efforts in combating and subduing it, were more successful than, I fear, they will prove to be, on referring to the number of men lost by it to the service, and I may say to society, out of the armies employed in that country. I think I may venture to assert, that ophthalmia will be at all times prevalent in any army serving in Egypt, and that a certain proportion of men will be incapacitated for service by the disease, under the best system of military arrangement and medical treatment; but that an immense number will be lost to the service, unless judicious preventive measures be adopted, and a proper system of medical treatment be pursued.

The troops in Sicily have been, it appears, at no time exempt from this species of ophthalmia; but it was particularly prevalent among them for a year or more after the return of the army from Egypt in the year 1807.

In Egypt it attacked, indiscriminately, women, children, and persons of all ages and ranks in the army. No peculiarity of constitution seemed to furnish an exemption from it. Persons of a scrofulous habit, or those having naturally weak eyes, were, however, more liable to it than others. The private soldier was, it is true, even in the relative proportion of soldiers to officers, the most frequent subject of attack; but the officer experienced occasionally its influence.

In Sicily, the disease seemed, as far as I have observed, to be pretty much confined to non-commissioned officers and private soldiers, and to their wives and children.

With respect to the most obvious existing causes of this species of ophthalmia, they are the action of dust and other irritating substances on the eye; exposure to high winds, especially on the march of an army, or in its manœuvring on a white and sandy plain; exposure to the glare and heat of the sun by day, and to the coldness and humidity of the night air, especially if it happens to blow fresh and the air be very humid. To these causes may be added, privation of sleep, fatigue, and intemperance in the use of intoxicating liquors. I think it reasonable to suppose that any of the preceding causes, if applied for a sufficient length of time, and in sufficient force, may produce the disease; but many, or all of them, are often found to cooperate in producing it in the case of the private soldier.

I may observe here, that many of the causes which I have now enumerated, exist in great force in lower Egypt. The heat of the sun is very powerful for a great part of the year, and there is little shade to ward off its direct rays, or verdure to relieve the eye fatigued by the reflection of the light from the white and sandy surface of a great part of the country. The coolness and humidity of the night air are remarkable, and as to dust and high winds, all who have visited the country bear ample testimony to them.* These circumstances have, no doubt, considerable influence in modifying the disease in lower Egypt. If to the effect of these be added the various hardships of a military life, and the intemperance and carelessness of the soldier in a climate to which he is not habituated, and in which the progress of inflammatory diseases is uncommonly rapid, can it any longer appear extraordinary that ophthalmia should be so prevalent and at the same time so formidable a disease to an army in that country?

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* Ophthalmia prevailed to a greater or less degree in every regiment in Egypt in 1807; but much more in some corps than in others. It was observed to attack, in a great number of cases, men on guard, or those employed on working parties. I often suspected that the dust, carried about in such quantities by the winds in Alexandria, and in the adjoining desert, contained a considerable portion of pulverised salts. The surface of many parts of the desert abounds with salts, the water obtained by digging in almost every place about Alexandria, is brackish, and the ruins and walls of the houses of Alexandria are incrusted with saline productions. Perhaps some explanation of the fact of salts being so abundant in the soil of Egypt, might be derived

from the circumstance of the land being so nearly on a level with the sea. The formation of salts on the walls of the houses of Alexandria, and the absolute disintegration of the calcareous stone of which the walls are built, form an interesting subject of chemical inquiry. The stones have totally disappeared in parts of the walls of many houses, and the mortar in which they were bedded remains. It would be taking me too much away from my present subject to enter on an explanation of this fact. I shall content myself with briefly mentioning that it appears to me that the demolition of the stone is effected by its particles being separated and detached from one another by the crystallization of salts in its pores, and by a part of its composition going to the formation of saline compounds. Perhaps it is in the same way that the calcareous stones used for the construction of the ancient Syracuse, and many other cities, have disappeared, as it is said, from the face of the earth. But to return to my subject—is it not probable that dust, containing a large admixture of salts, may in as far as it acts as cause, contribute to the production of a violent inflammation of the eyes? I do not mean, however, to say that the co-operation of this cause is necessary to produce this effect, for I have repeatedly seen instances of the most violent ophthalmia in persons who lived on board ship, and never came on shore.

Many of the causes arising from soil and climate, which I have considered as belonging more expressly to Egypt, exist also in Sicily, but in a less degree of intensity.

It may appear surprising to many who have not been in Egypt or Sicily, and who have heard so much of the delights and warmth of a Mediterranean climate, to hear cold adduced as a cause of disease in these parts of the world. But, it must be recollected, that though the thermometer does not fall as low in these countries, as in the northern parts of Europe, still it rises much higher, and descends often in the winter season to a degree at which the body cannot maintain its proper temperature, in a state of inactivity. Besides, the body is rendered so susceptible of the action of cold by the long and uninterrupted summer heats in these latitudes, that a degree of temperature, which would be called warm in England, produces here a sensation of cold, and in all probability has as much power in producing diseases arising from cold, as a more reduced degree of temperature on more northern regions. With respect to the climate of Sicily, it may be said to be unpleasantly hot for four months, temperate for four more, and cool for the remaining months of the year. Its vicissitudes from hot to cold, and *vice versa*, are very considerable in the cool season. It is not unusual to experience two or three vicissitudes, with a difference of several degrees of temperature in the course of one day. There is also considerable difference, at times, in the humidity of the atmosphere. The *Scirocco,* or south-east wind, which blows in general pretty freshly, is generally loaded with humidity. The climate of lower Egypt is, perhaps, more uniform in temperature, but high winds are very prevalent, and the night air is cool and uncommonly damp for a great part of the year.

The appearance, in the first British army that visited Egypt, of a more violent species of ophthalmia than had before at least been noticed by our army medical men; the degree to which the disease prevailed in the army; the continuance of it in some regiments after leaving the country; and the circumstance of its not only attacking a great number of men of the same corps after once appearing in it, but of its spreading from one corps to another; have very justly given rise to the opinion, that this species of ophthalmia has been introduced into our army in Egypt, and that it is contagious. In addition to these facts, I can safely state, from my own experience, that this species of ophthalmia prevailed, to an alarming degree, in some regiments in Egypt in 1807; and that it was much more prevalent, for a year, or more, in some of the regiments which returned from that country to Sicily in that year, than in those which did not form a part of the expedition to Egypt. I can further say, that when it made its appearance in any regiment, whether it had been in Egypt or not, it generally attacked a large proportion of the men of that corps. These are imposing facts; and though some of them may be accounted for without adopting the supposition of the disease being contagious, still I am disposed to think that the impartial consideration of the whole of them will lead to, if not firmly establish the inference of the contagious nature of the disease.

With respect to the fact of the disease attacking a great number of men of the same corps, some explanation may be given of it, by attending to the similarity of their habits, situation, and employments. Thus we find, that if a regiment be stationed in a place in which the cause of any disease is particularly prevalent, a great proportion of the sick of that regiment will be found to labour under the same disease. Now, as ophthalmia is produced by a variety of causes as well as contagion, it is found to prevail more in particular situations than in others; but will this account for its continuing in the regiment after it is removed from that station, and for its being communicated from the infected regiment to one which had not been exposed to the causes, and in which the disease was previously unknown; I may also ask of those who maintain that the disease is not contagious, or new, in the medical history of the army, why the causes, to which our troops have been exposed in various parts of the world, did not produce ophthalmia in a degree and form of violence to attract general attention as well before the year 1801 as after it? Influenced by the preceding views of the subject, and submitting, at the same time, to the superior judgment of others, I have, myself, always acted on the supposition of the disease being contagious. Indeed, were the evidence less strong and persuasive on this side of the question than it really is, I think it would be the duty of every medical man in the army to incline to it, until the matter is put beyond all doubt, as it holds out numerous and obvious advantages. But as contagion is not the sole cause of this disease, we are to keep in view the other causes, and to guard against them as much as possible.

There are strong reasons to conclude, from analogy, that this species of ophthalmia may be produced by the introduction of morbid matter into the eye. I have reason to suspect, that it is occasionally propagated in some corps to a greater extent than it would otherwise go, by this means. I can adduce no direct evidence in support of this opinion, but I am disposed to think, the consideration of the habits of life of soldiers, their carelessness, and the crowded manner in which they live, will bear me out in it.

Though individuals may entertain very different opinions as to the less obvious causes of this disease, still I am persuaded, that all medical men, who have had an opportunity of observing its rise and progress in an army, will be agreed as to the propriety and advantage of a speedy and effectual separation of the diseased men from the healthy, and of their being confined in an hospital set apart for themselves. For my part, as far as I have been able to observe, I have found, that the vigilance of military and medical officers, in detecting the disease on its first approach, and the plan of separation which was adopted in Egypt and Sicily, have had the effect of saving the eyes of many, by bringing those that were attacked immediately under medical treatment; and I have no doubt of diminishing the number of persons attacked by cutting off the source of contagion. Such has been the happy result of this measure, carried on with steadiness and perseverance in the army in Sicily, that ophthalmia is now (1810) so much diminished, that a recent attack of any of its acute forms is extremely rare. Surely it does not betray too sanguine a disposition to look for a still further diminution of the disease in the army to a continuance of the same measures.*

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* It is incumbent on me to mention here that Dr. Franklin, inspector of hospitals, gave it as his opinion in the first conversation I had with him on the subject, that ophthalmia was contagious. I do not mention this fact so much with a view of supporting my own opinion by so highly respectable an authority, as of stating, that Dr. Franklin founded on it, and carried into effect, establishments for ophthalmic patients and convalescents, the favourable results of which have far exceeded the expectations of their most sanguine admirers.

TREATMENT.

It would appear, that the indications of cure in this variety of ophthalmia, ought to be obvious on the first view of the subject; yet there are few diseases, on the treatment of which, medical men in the army entertain such various, and even contradictory, notions. Some, supposing it to be a new disease, resembling, in no respect, the ophthalmia on which we have received lessons at school, overlook its inflammatory nature, and, of course, err very widely from the proper mode of treating it. Others, confounding it with the mild and chronic species of the disease, have no precise or settled notions of its nature, and, consequently, do not see clearly the necessity of adopting, in time, and with vigour, the measures calculated to arrest and subdue its violence. These aberrations of judgment are, in all probability, owing to the disease not yielding, in general, to the mode of treatment prescribed by the practitioners in private life, on whose authority, in other medical subjects, we have implicitly relied. It is certainly not owing to any deficiency of judgment or want of professional ability, but to their not having seen the disease in the extreme violence in which it appears in the army, that these persons have not recommended a more effectual mode of treatment. I have every reason to believe that the species of ophthalmia which we have now under consideration, rarely presents itself in practice in civil life. * The few cases of it that do occur, fall generally under the observation of persons who seldom think of publishing an account of them; and this circumstance, with that of the rarity of occurrence of the disease, will account satisfactorily for our not having copious and correct descriptions of it from that quarter.

As all the symptoms are of an highly inflammatory nature, and as the organ concerned can suffer no derangement in its structure, without greater or less injury to its functions, it is evident that a resolution of the inflammation must be the primary object. This, in a number of cases, is not to be accomplished, unless judicious and active means be employed within twenty-four or thirty hours after the accession of a violent degree of inflammation. Such is the tendency of the cornea to suppurate after this time, that the most active antiphlogistic means, pushed to a great extent, sometimes fail to prevent its suppuration. In no disease is it more necessary than in this to adopt a fixed and vigorous mode of treatment, in order to ensure success. As time is of the utmost importance, it will not answer to try first blisters and collyria, and then go on to blood-letting, topical

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* I do not recollect to have met, during my attendance at civil hospitals in Great Britain and on the Continent of Europe, a single case of ophthalmia, equal in violence to many I have seen in our own military hospitals.

or general—Bleeding, and that from one or both temporal arteries, as one or both eyes may be affected, to the amount of sixteen, twenty ounces of blood, or more, according to the urgency of the case and the strength of the patient, is to be the first measure. After this a large dose of salts is to be administered; the whole head is to be shaved; and large blisters are to be applied behind the ears and to the nape of the neck.* The patient is to be lodged in a dark but well ventilated room, and the ball of the eye, if there be any purulent discharge, is to be repeatedly washed by injecting some mild fluid between the eye-lids. It is particularly necessary to avoid violence in injecting or introducing by any other means the fluid into the eye. I do not expect any advantage from this latter measure but that of simply removing the acrid and irritating matter from the surface of the conjunctiva. Whether there be a purulent discharge from the eye or not, the ball of the eye, palpebræ, and forehead, are to be kept constantly cool and moist, by means of one fold of fine old linen, wet with a weak solution of cerussa acetata, laid loosely over them. I must observe, that in some few instances the saturnine solution seemed to irritate and disagree very much with the eye; and that I have been obliged to desist from its use, and substitute for it a mixture of vinegar and water, or water alone. The cerussa acetata appeared to aggravate the symptoms in some cases in which there was a redness of the forehead and temples. When I had it in my power, I caused the temperature of the fluids I used in this way to be reduced by means of ice, and I applied them in that state to the eye.*

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* Blisters are not to be applied to the temples, lest it may be necessary to take more blood from the temporal arteries. In cases, however, in which blisters were applied to the temples before the patient came under my care, I have been obliged to divide the temporal artery, nor have I ever abstained from the measure on account of the necessity of cutting through the blistered surface. I have met with no more difficulty in obtaining blood in these cases than in many others.

If the inflammation do not become considerably more moderate in eight hours after the first bleeding, it will be necessary to take more blood from the temporal artery, regulating the quantity according to the intensity of the inflammation, and to apply a blister to a great part or the whole of the surface of the head. And if the inflammation has not completely subsided in eight hours more, it will be still necessary to repeat the bleeding from the temporal artery to a considerable amount if the symptoms seem to require it.

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* When a solution of cerussa acetata is used, it will be necessary to wash the piece of linen occasionally, to prevent the accumulation of the salt of lead on it, which necessarily happens in consequence of the evaporation of the water. By neglecting this precaution, I have sometimes seen the piece of linen become so impregnated with the salt, that a much stronger solution was applied to the eye than was originally intended. Care must also be taken not to allow the wet cloth to remain so long on the eye as to be heated and converted into a warm fomentation.

In conformity to this plan, I have, in many cases, taken from the temporal artery from thirty to fifty ounces of blood in the space of the first twenty-four hours of the disease; and I have had the satisfaction to see the most violent degree of inflammation completely subdued by this practice in conjunction with the application of blisters and the other means just pointed out. It is not to be understood, however, that it is necessary to carry the bleeding in all cases to this extent, which I think may be fairly stated as the *maximum*. The inflammation, especially when attacked early, may be completely subdued, in many cases, by one bleeding of sixteen or twenty ounces, or by two bleedings of ten or fifteen ounces each, in conjunction with the effect of blisters and the other means. It is difficult to give precise rules as to the extent to which the bleeding is to be carried; but as it is the principal remedy upon which the cure of the disease rests, it is evident that it ought to be proportioned to the degree of violence of the symptoms, and repeated until all the inflammatory symptoms are very considerably abated. As I have never used bleeding without the application of blisters, I cannot say that the inflammation would yield to the first remedy solely; but as long as I had any suspicion of the least trace of inflammation, I never desisted from the application of a series of blisters to the temples, behind the ears, and to the nape of the neck.

When the inflammatory symptoms have disappeared, which is known by the cessation of pain and intolerance of light, the patient may be allowed to use a weak solution of zincum vitriolatum, or some such astringent collyrium. The zinc, in the proportion of a grain and half, or three grains to the ounce of water, I have found the best collyrium. It does not, however, agree equally well with all patients, and I have been often obliged to substitute for it a solution of alum, acetate of zinc, or of lead. The addition of about half an ounce of tincture of opium, to eight ounces of any the preceding solutions, is found to contribute much in allaying irritation and diminishing weeping in many cases. Any of these washes may be persisted in as long as any tenderness of the eye remains.

Too much attention cannot be paid to the idiosincrasy of patients respecting collyria. The same wash does not agree with all patients, and a collyrium of a strength scarcely sufficient to produce the slightest effect in some, will irritate and inflame the eyes of others.

The swelling and turgescence of the conjunctiva, and the purulent discharge, are always considerably diminished by the means which reduce the inflammation. They continue, however, sometimes in a moderate degree, after the pain, intolerance of light, and other inflammatory symptoms have totally disappeared ; but they in general give way in a few days to the use of astringent collyria, and to bathing the eye repeatedly in cold water.

I suppose it is unnecessary to observe that the patient ought to live on a low and cooling diet, and be kept free from every thing likely to irritate his eyes during the treatment of the inflammatory stage of his disorder. His bowels must be kept freely open by means of neutral salts, and something may be done towards alleviating pain by large doses of opium. I have no dread of this medicine at any moment of the inflammatory stage ; but it is to be considered only as a palliative remedy, and no relaxation in the other parts of the treatment is to be admitted on account of its use. It is particularly well adapted to those cases in which the pain intermits and comes on in violent paroxysms. A large dose of opium, given a little before the expected exacerbation, mitigates considerably the sufferings of the patient.

Even after all the inflammatory symptoms have disappeared, and the eye has regained its natural and healthy aspect, it will be necessary for the patient to observe precautions. He must accustom himself by degrees to the impression of light, and he must by no means fatigue his eye by reading, or any other exercise in which that organ is concerned. When he walks out he ought to wear a green shade over his eyes for a considerable time. Exposure to night air, to a current of cold air, to fatigue or want of rest, is highly prejudicial, and will, in all probability, bring about a relapse. Such is the tendency of the inflammation to return, for weeks, I may say months, that a relapse is often brought about by the slightest causes that irritate the eye. I have repeatedly seen this happen from the use of even a moderate quantity of wine. No person but one familiar with the disease, and the treatment of ophthalmic patients, can have an adequate idea of the influence of spiritous liquors on the eye, when once weakened by an attack of inflammation. It is not unusual to find the cornea, which was before perfectly transparent and destitute of red vessels, become cloudy and covered with blood-vessels, in consequence of one fit of drunkenness. Small specks, and little depressions of the cornea, which were before scarcely perceptible, have been rendered conspicuous by the same course.

I have never used poultices or warm fomentations to the eye in this species of ophthalmia, as I was apprehensive they would increase the tendency to suppuration. Indeed in some few cases, in which this practice was adopted, before the patients came under my care, I found it impossible to stop the suppuration of the cornea. When the purulent discharge was very copious, and the eye-lids were glued together in the morning, I have been sometimes compelled by the cries and sufferings of the patient to allow him to bathe his eyes in tepid water once a day. As I do not consider the appearance of the purulent discharge as indicating a cessation or even diminution of the inflammation, it cannot, of course, enter into my plan to recommend any means of encouraging it.

Some persons recommend scarifying the turgid conjunctiva, or even cutting away a circular portion of that membrane. I must confess, that as a first measure, I have perceived no kind of advantage from either of these operations. They are not of themselves by any means adequate to check, much less to subdue, the inflammation, and they occasion much pain and irritation of the eye. After the inflammation has been somewhat allayed by the vigorous treatment which I have already proposed, they will be often found excellent secondary measures. When scarifications are had recourse to, they may be made with the shoulder of a lancet, and they are to be carried down to the sclerotica. Of the two operations I prefer cutting out a circular portion of the conjunctiva. Neither of them is, however, to be used without some limitation. They are, beyond all doubt, most useful and best adapted to cases in which there is little or no purulent discharge from the conjunctiva. I have frequently found the discharge, particularly in scrofulous cases, to be much increased by them.

Now when this matter is copious, independently of its irritating and corroding effect on the coats of the eye, it is attended with another disadvantage, that is, the necessity of frequent interference with the eye for the purpose of washing it out, which is, I have little doubt, productive of much mischief.

As to the operation of cutting out a circular portion of the conjunctiva, it is best performed with a small forceps, and a curved round backed scissars. The patient being seated on a chair before the light, an assistant is to keep the eye-lids open and support the head, while the operator seizing with the forceps, a portion of the conjunctiva near the lucid cornea, is to commence the incision at that spot, and carry it round the ball of the eye, as near the cornea as possible. Bleeding is to be encouraged by removing the clot of blood from time to time and bathing the eye with tepid water. I have never known a sloughing of the cornea, or any injury result to this, the other coats, or to the humours of the eye, from this operation, when performed under proper circumstances and at a proper period of the disease.

Blisters, though applied ever so extensively to the head and parts in the neighbourhood of the eye, will be found, I should suppose, totally inadequate, of themselves, to subdue the inflammation. As an auxiliary measure they prove of incalculable use, and they possess the advantage of not reducing the strength, though applied to any extent or for a considerable time.

I have given a full trial to bleeding with leeches in this variety of ophthalmia, and I have found the effect, though a dozen or more were applied, to fall very far short of that from opening the temporal artery. They may, no doubt, be used with advantage in cases in which the propriety of taking more blood from the temporal artery may be questionable; but experience justifies me in stating that they are, of themselves, totally inadequate to subdue the inflammation in its early and violent stage. When leeches are used as auxiliaries, or with any other view, they ought to be applied to the temples and forehead; for when they fasten on the eyelids, or under the eye, their bites occasion much irritation, and there is always a quantity of blood effused into the cellular substance of these parts, which increases the tension and swelling of the eye-lids, and adds very much to the sufferings of the patient.

Cupping, and scarifying the temples, I am disposed to place, as to effect and utility, in the same scale as the application of leeches.

I have, in many cases, tried bleeding from the arm to a great extent, and I am fully persuaded that, under every variety of circumstances attending the disease, it is vastly inferior in efficacy to taking blood from the temporal artery. I am also of opinion, that the inflammation will be much sooner arrested, and more speedily and effectually subdued, by a given quantity of blood taken from the temporal artery than by a much larger quantity taken from the arm. I fear that patients have been sometimes so much exhausted by large bleedings from the arm in this disease, that their general health has suffered considerably, and that the inflammation, from this cause, as well as the inadequacy of the bleeding to subdue it effectually, has often passed into the chronic state, in which it has either totally destroyed the eye, or rendered the patient unfit for the duties of a soldier.

I have also given a trial to bleeding from the jugular vein. This mode of taking blood my experience leads me to consider as preferable to bleeding from the arm, but I have seen no advantage attending it to induce me to think it superior in efficacy to opening the temporal artery. Besides, opening the jugular vein is a troublesome operation, and often not easily performed in some persons.

It appears from the writings of the ancient physicians, many of whom lived and practised in the very countries in which it has fallen to the lot of some British army medical men to see the disease, that bleeding from the vessels near the eye was recommended in ophthalmia in the earliest days of medical science. This fact, as it must have come to the knowledge of most medical men in the course of their reading and studies, has, no doubt, excited the curiosity and fixed the attention of many medical men in our army, both at home and abroad. I cannot learn, however, that a remedy recommended by so venerable authorities, and one having all the appearances of being eminently useful, has been either generally adopted or pushed to a sufficient extent by any considerable number of medical men serving with the army in the Mediterranean. Those who, in the army at present serving in this part of the world, have adopted the practice in its true spirit, many of whom I have the pleasure of numbering among my friends, are agreed as to its superior efficacy. Surely, it is not a little gratifying to us to be able to announce, as more successful than any other hitherto adopted, a practice carried into effect in the same countries in which it was originally recommended by the most venerable medical authorities of antiquity.

The Arabian physicians, and many of the medical writers of the middle ages, mention the operation of taking blood from the vessels in the vicinity of the eye as a thing extremely common in ophthalmia. What medical man ever visited Egypt without being forcibly struck by reading the following observation of Prosper Alpinus? "Usus vero venarum capitis apud illos Ægyptios frequentissimus atque familiarissimus est, quòd sæpe ingens ipsorum caterva oculorum lippitudinibus corripiantur atque afflictentur."—"Itidemque venas temporum magnorumque angulorum oculorum, ipsi in eisdem affectibus secant." De Medicina Ægypt. lib. ii. c. 10.

With respect to the operation of opening the temporal artery, I perform it generally on the anterior branch of that vessel. Some purpose, independently of the extraction of blood from the system in general, and that too from a part so contiguous to the inflamed spot, may be answered by opening this branch, as it communicates freely with the vessels which supply the internal and external parts of the eye. The operation itself is not only free from danger, but inconvenience. Before dividing the integuments, it is necessary to ascertain precisely the course of the artery, which is easily done by means of its pulsation. This being settled, an incision, somewhat less than an inch long, is to be made in the integuments in a transverse direction to the artery, and carried down until it is laid bare. The vessel is now to be opened with a lancet, or by a gentle stroke of the scalpel used for dividing the integuments. When as much blood as is necessary is taken away, it is advisable to cut the artery across by another stroke of the scalpel. The wound is now to be cleared of blood, its sides brought neatly together, and retained so by a slip of adhesive plaster. This precaution secures, in general, against any after bleeding; but in order to guard more effectually against this event, a small compress of lint may be applied on the adhesive plaster, and secured by one or two turns of a roller round the head.

I have sometimes succeeded in obtaining as much blood as I required by puncturing the artery with a lancet, as is done in the operation of letting blood at the arm. I am informed by a medical gentleman in the army, that this is his usual mode of taking blood from the temporal artery, and that he very seldom fails in obtaining as much blood in this way as he wishes to draw off.

I know some persons are of opinion that it is not possible to obtain a large quantity of blood, in many cases, by opening the temporal artery. To this objection I can reply, that I have not attempted dividing the artery below its bifurcation, or touching any part of it but its anterior or posterior branch, and that I have not failed in more than one instance in a hundred to procure as much blood as I wished to draw off. My assistants and myself have now opened each some hundreds of temporal arteries, without failing, I may safely say, in half a dozen of instances, to procure fully as much blood as was required. Nay, we have performed the operation on the same persons three or four times, or even more, and have uniformly obtained as much blood each time as we wanted. In no instance have we experienced any difficulty in stopping the bleeding, or have we observed any unpleasant consequence to follow the operation. The patient generally faints, if he be bled in the erect posture, when twelve or fifteen ounces of blood are taken away; but this is rather a desirable event than otherwise.

Sometimes, when the artery is not cut quite across, a small aneurism is formed, which, if left to itself, seldom produces any inconvenience, but which readily yields to moderate pressure or to dividing it with a stroke of a scalpel. At other times, when the artery is not completely divided, the wound in the integuments does not unite, a small black spot appears in the centre of it, which suddenly gives way, and a bleeding ensues. Both these events are owing to mismanagement. If an attempt be made to stop the bleeding by pressure, the patient will be exposed to much unnecessary pain and trouble, and the object will not be effectually or speedily obtained. As soon as it is found that the wound does not unite, and that a black spot is observed in the centre of it, all that is necessary to be done is to divide the artery quite across, and to bring the lips of the wound into contact as I have already pointed out. This occurrence is a very rare one, and can seldom happen under the management of an expert operator; and the mode of remedying is so simple that it furnishes no solid objection to the operation.

It would appear then, from both experience and a knowledge of the anatomy of the part, that opening the temporal artery is as safe a mode of letting blood as any other with which we are acquainted. Indeed, the only objection to this operation is that arising from the supposed impossibility of procuring enough of blood. I have already shewn how much my experience is in opposition to this opinion, and I might adduce to the same effect the testimony of many others who have adopted the practice of opening the temporal artery in ophthalmia and other diseases. But as it is admitted that a sufficient quantity of blood can be obtained by the operation in some cases, it follows that the objections to it must diminish in proportion to the number of such cases; and as the success or failure of the operation cannot be predicted by any known means without making the trial, is it not incumbent on us, were it proved that it fails in a much larger proportion of cases than is admitted by those who object to it most strongly, to give the patient the chance of a remedy, which promises more relief in his complaint than all the others which have been used for it, put together?

I have been obliged, in about one case in a hundred, to relinquish the first incision in the artery on account of not getting blood enough from it, and to make a second incision, sometimes in the other branch of the artery, and at other times lower down in the same branch. I have uniformly succeeded in the second attempt; and had this not been the case, I question if it would not have been advisable to make a third incision rather than give up the advantages of the operation. There is to be sure a good deal of cutting in this way of going to work, and two or three small scars will remain in the temple; but I leave any one to judge of the difference between the pain of the operation, and the scarcely perceptible disfiguration of a small cicatrix, compared with the torture of a violently inflamed eye, and the hideous deformity of blindness, without once taking into account that endless and inconsolable calamity.

The plan of treatment which I have now proposed will, I believe, be found as effectual in subduing the inflammation, and bringing the disease to a happy termination, as any other with which we are acquainted. I have not adopted the usual custom of giving returns of the number of patients admitted into hospital, and of specifying the number cured, and those who lost their sight, to give validity to my opinions and practice; for were I to adopt this plan, I would be under the necessity, in order to enable others to judge fairly, to give the individual cases of a great number of patients. Nothing can furnish more fallacious grounds for judging of the merit of any particular mode of practice than returns from military general hospitals, without an elucidation of this kind; as many of the patients are transferred from regimental to general hospitals, on various inevitable occasions, in such a state of disease as to be past recovery. I do not mean here to cast any imputation on the character of regimental medical officers, or to say that the same melancholy fate would not have befallen those unhappy people, were they originally sent to a general hospital on the first appearance of their disease.

Having hitherto treated of the means calculated to prevent the suppuration of the eye; it remains for me to make some observations on the plan of treatment to be adopted when that distressing event takes place.

When, therefore, a suppuration of the cornea takes place either in consequence of some peculiarity of constitution of the patient, mismanagement on the part of the medical practitioner, or the want of timely assistance, our efforts must be directed towards palliating the sufferings of the patient, and saving the eye from total destruction.

It is plain when the whole of the cornea is involved in the suppuration, that nothing remains to be done, but to palliate the sufferings of the patient. The inflammation, however, does not terminate with the suppuration of the cornea. It continues in the iris and other parts of the eye; and opening the temporal artery, blisters and purgative medicines will, as may be expected, afford most relief. To these are to be added warm fomentations to the palpebræ, great attention in washing the purulent matter from the eye, and the free internal use of opium.

As to ulcers of the cornea, I know of no mode of preventing their progress, and causing them to fill up, but that of keeping down inflammation, and leaving nature to perform her work undisturbed. With this view, then, blood must be drawn copiously from the temporal artery, and the other parts of the antiphlogistic treatment, which I have already pointed out, must be had recourse to. I am perfectly satisfied that it is to this mode of treatment that we are to look for the prevention of the spreading or penetrating of the ulcer, and consequently for the preservation of the eye. I may observe here, however, that ulcers of the cornea, by keeping up an almost constant state of inflammation of the eye, cause the disease frequently to pass into the chronic state, and that when we have reason to think this is the case, we are to adopt the treatment suited to it. It is recommended by some to touch the ulcers of the cornea with caustic: this practice, I am much disposed to think, ought never to be attempted, until the inflammation is reduced as low as it is possible to bring it under such circumstances. I am not quite certain that it is productive of good effects, even when its operation is aided by every possible precautionary measure. I have often had reason to suspect that it revived the inflammation, and thus brought about an extension of the ulcerated surface, and the deposition of more opaque matter than, in all probability, would have taken place, were the ulcers left entirely to nature. The caustic also often corrodes a portion of the sound cornea adjoining the ulcer, and thus occasions an enlargement of the ulcerated surface with all its concomitant dangers and disadvantages. Ulcers, when not seated before the pupil, affect vision so little, that it is of very little importance with what kind of matter they are filled up. The great object is to prevent their penetrating deeper, or spreading so as to obscure the pupil; and I greatly fear that neither of these purposes is to be effected by the application of caustic.

When a deep ulcer is situated on the center of the cornea, exactly before the pupil, as this is the part of the globe of the eye most affected by the action of the muscles of the eye, and as it is necessarily weakened by a loss of substance, it frequently happens that the cornea gives way at the ulcerated point, and the escape of the aqueous humour, with the protrusion of the iris and obliteration of the pupil, follow. I have applied caustic to the ulcer in cases of this kind, as the danger of the eye bursting is so imminent as to justify any practice promising the slightest benefit. Finding, however, that this practice rather augmented than diminished the evil; and that no method of treatment hitherto adopted, had the slightest effect in saving the eye from total destruction; it occurred to me that the pressure on the ulcerated and weakened point of the cornea, might be diminished by letting out the aqueous humour. I have accordingly performed this operation in every case that has occurred to me lately, in which there was a deep ulcer in the center of the cornea; and I have had the satisfaction to find, that by the time the aqueous humour was wholly regenerated, the ulcer of the cornea was so much filled up, and the part so strengthened as to be secure against bursting. By this operation I saved the iris and pupil from injury; and the only impediment that remained to the sight, was a small cloudy spot in the site of the ulcer, which though occasioning some imperfection of sight, was not so dense and impenetrable to the rays of light, as the cicatrix following a rupture of the cornea. The inflammation of the eye in general was always diminished by letting out the aqueous humour; and this, I have no doubt, contributed much to the deposition of less opaque matter in the ulcer than would otherwise have taken place. In some cases, the spot was not so opaque as to prevent the total admission of rays of light; and in others it was so circumscribed as to obscure only a small portion of the pupil. This operation may be performed with a lancet, or the knife used for cutting the cornea in extracting a cataract. The opening is to be made in the lower part of the cornea near its junction with the sclerotica, and the instrument must be introduced so as not to injure the iris.

It appears, then, that the most favourable thing that can happen in all ulcers of the cornea, is their filling up with a matter which will admit the passage of some rays of light. A cicatrix is the inevitable consequence; but this is observed to occur in various degrees of density and cloudiness. In some cases, it is so opaque as to obstruct totally the passage of the rays of light, while in others, it has a certain share of transparency. Cicatrices from a rupture of the cornea, or deep ulcerations attended with much inflammation, are always the most opaque. The ulcerated portion of the cornea, when the ulcer is very extensive, and situated remote from the center of the cornea, is sometimes so weakened by the loss of substance as to yield to the pressure of the aqueous humour and to project beyond the regular convexity of the cornea. As the ulcers in which this takes place are very extensive, the opacity generally extends over a certain portion of the pupil, and vision is injured by this circumstance, and by the derangement in the convexity of the cornea.

The cicatrices remaining after ulcers and a rupture of the cornea, constitute a large proportion of those defects of the eye, which are called specks. I cannot say that I have found any topical application or internal remedy of much use in diminishing these. I have tried the internal use of mercury, and various stimulant and corrosive applications to the eye, without any manifest advantage. The only thing, perhaps, that human art can do in diminishing the opacity in these cases, is to divide the red vessels that run to the opaque spot, and in that way prevent a supply of opaque matter. We are not, however, to put down every recent case of this kind as insusceptible of improvement.— When the healthy state of the eye is re-established, and a proper balance is restored in the action of the absorbing and secreting vessels of the eye, the absorbents begin to act with great force, and reduce considerably the dimensions and cloudiness of the speck. I have seen, in many instances, specks of this kind, which obscured the whole of the pupil, so much reduced in size by time, that the person regained a considerable share of sight. No case, however, has occurred to me in which more or less opacity has not ensued to ulcers of the cornea.

I have not observed any benefit result to the sight from destroying the little prominences, which are sometimes formed by the process of cicatrization, in the site of ulcers of the cornea, as they are opaque generally through the whole or a considerable portion of the depth of the cornea.

Various methods of treating protruded portions of the iris have been proposed. Some recommend removing the little eminence by a cut of a scissars, while others advise destroying it to the level of the cornea by means of caustic. The first method, though apparently the most expeditious and efficacious, is liable to one great objection, which is that a fresh portion of the iris is apt to protrude, after the removal of the first. The second is free from this objection, if it be used under proper circumstances. It will be necessary, therefore, before applying the caustic, to reduce the inflammatory symptoms by the means already pointed out. If the protrusion be touched with the caustic before this is accomplished, the inflammation increases, and the iris protrudes in still greater quantity; whereas if the caustic be used, under favourable circumstances, it is productive of the most marked and decided advantages. All things, therefore, being in a proper train for the use of this remedy, an assistant is to keep the eye-lids open, while another person is to touch the protruded portion of the iris with a piece of argentum nitratum, rounded at the point. The patient sometimes moves the eye so rapidly about, that it is difficult to touch the little eminence with the caustic; but a person accustomed to the operation, will easily surmount this, by watching the motions of the eye, and bringing the caustic dexterously into contact with the iris. The patient complains of a very unpleasant sensation for some time after the application of the caustic; but this is soon succeeded by a state of relative composure and ease. When the eschar formed by the caustic falls off, the protrusion will be found considerably diminished in size; but if it be not brought to a level with the cornea, it will be necessary to repeat the application of the caustic, until that end is attained. It is seldom necessary to apply it more than twice or thrice, with an interval of three or four days between each application. The eye is to be washed out by injecting some tepid water in it immediately after the application of the caustic. Protrusions of the iris, of ever so long a standing, may be effectually and safely removed in this way.

In cases in which the iris, though protruded, is, as I suppose, contained in a membranous sack, the utility of caustic is by no means decided. Before doubts arose in my mind respecting the nature of protrusions of this kind, I touched the little eminence with caustic, and I sometimes found that no impression was made on it by a first application. By a repetition of the practice, however, the membrane was corroded, the aqueous humour escaped, and the iris protruded in greater quantity. After observing these unpleasant occurrences, I abstained from applying the caustic in all cases of this kind, and I have had the satisfaction to see the little eminence at length disappear of itself quite to the level of the cornea, an adhesion, however, always remaining between the iris and cornea. It is but fair at the same time to acknowledge that the progress and termination of all cases of this kind were not so favourable. In some the sack gave way, sometimes without any perceptible cause, and at other times in a fit of sneezing or coughing; and it became necessary to have recourse to caustic to destroy the protruded portion of the iris.

All attempts to return the iris into the cavity of the eye are not only vain but hurtful. In those distressing cases in which the iris continues to protrude, all that can be done, is to reduce the inflammation as quickly as possible, and then have recourse to the caustic.

As the puriform matter effused into the anterior chamber of the aqueous humour, was, in no case that occurred to me, so abundant as to cause great distension of the eye, I have never been under the necessity of puncturing the cornea, for the purpose of letting it out. I have the same observation to make respecting effusions of blood. Both these fluids have been absorbed in every case that I have seen, except in those, where they were discharged through an aperture of the cornea. As these symptoms are always preceded, and generally accompanied by a violent inflammation of the eye, bleeding from the temporal artery, and the other means already pointed out, are those on which our reliance is to be placed for the removal of them. If the fluids be not absorbed speedily, it will be advisable, as soon as the inflammation is subdued, to put the patients upon an alterative course of calomel.

Opacity of the lens, or of its capsule, in one or both eyes, is often produced by the violent inflammation in this species of ophthalmia. I cannot say that I found any remedy or mode of treatment, except that by which the inflammation is subdued, of use in removing these symptoms. I have uniformly put patients labouring under these affections on a course of mercury, and I have kept them under the influence of that medicine for a great length of time, without being able to perceive any perceptible diminution of the opacity in a great number of cases. In a few, however, whether owing to the effects of the mercury, or the re-establishment of a proper balance in the action of the vessels of the eye, I have found that the opacity, whether seated in the lens or its capsule, gradually diminished, and was reduced to one small spot, seated behind the center of the pupil. Vision was very imperfect in all these cases, but it generally improved in time.

I have not as yet ventured on an operation for the purpose of removing the opaque lens or its capsule; in the first place, because I have met with no case in which the opacity in both lens was so great as to do away all hope of its diminishing in time, and when the opacity occurs in one eye only, let it be ever so dense, I do not think the operation justifiable; and secondly, because such is the weakness and tendency of the eye to inflame for a great length of time after suffering from this disease, that I am doubtful if any operation on the lens, let it be ever so opaque, will improve the state of the eye, until that tendency is completely done away by time, and the different parts of the eye restored to their healthy tone and action.

As the inflammatory affections of the iris are always accompanied by an inflammation of the coats of the eye, they can require no peculiarity of treatment. In cases in which adhesions take place between the iris and cornea or lens, I think it advisable not to attempt any operation, unless the pupil be obliterated. Many unfortunate cases of the latter description have fallen under my observation, and I have thought that an attempt might be made towards opening an artificial pupil in some of them. I have lately read in a Neapolitan newspaper, that an operation of this kind has been performed with success on several persons in France. I have not, however, made any attempt of the kind, for the reasons which I have already mentioned, as influencing me in cases of opacity of the lens or its capsule.

Having now gone through the treatment of what may be called the two stages of this species of ophthalmia, and having pointed out the diet and regimen suited to patients in the first stage, it remains for me to say, that the patient, during the whole course of treatment of the second, is to be kept as quiet as possible, and out of the influence of every cause likely to irritate his eyes. His diet is to be mild and moderate, and no wine or spiritous liquor is to be allowed him, unless under the most pressing circumstances.

It is evident from the consideration of the history of this disease, as well as from that of the mode of treatment found most successful in it, that inflammation is the great source of all the evils with which it is pregnant. By the timely resolution of this symptom the eye is in general saved; but from some strange peculiarity in the constitution of patients, or from a weakness and loss of tone produced in the vessels and coats of the eye, by the intensity of the inflammation, it sometimes happens that the disease changes its character, and assumes the chronic state. It is highly important to mark this distinction, as the respective methods of treatment of both varieties are influenced by it.

CHAPTER III.

Of Ophthalmia Chronica.

It is difficult to give a satisfactory description of this variety of ophthalmia, as it grows out of the others, and is accompanied by a great number of their symptoms. As it is attended by a loss of tone and relaxation in the vessels and coats of the eye; and as it sometimes originates from a general debility of the constitution, it might perhaps be viewed as a transition of the disease from one stage to another. But as many of its symptoms present some peculiarity of character, and require a peculiarity of treatment, it may answer some purpose to collect under one head all the observations arising out of these circumstances.

Ophthalmia is often found to pass into the chronic state in consequence of its repeatedly occurring in the same person. This state succeeds much more frequently to attacks of the virulent, than to those of the mild species of the disease. It sometimes assumes the chronic state after a first attack of the mild species; but this is in general owing to some peculiarity of constitution, or to bad treatment, especially the improper use of astringent or stimulant collyria. If one eye be weaker than the other, as is generally the case with persons who squint, the inflammation in the weak eye is extremely liable to pass into the chronic state, and to be afterwards revived by the slightest causes. As the other eye is affected by sympathy, persons with a defect of this kind, are liable to repeated attacks of inflammation in both eyes from causes which scarcely affect the eyes of others.

I have found ophthalmia prone to pass into the chronic state, when it attacked patients labouring under other complaints, or persons in a state of debility recovering from disease. It sometimes assumes the chronic state in patients under the influence of mercury ; and it is not unusual to see it pass into the chronic state in persons who have suffered much from pulmonic or rheumatic complaints, or in those labouring under herpetic affections, and in persons whose constitution is shattered by intemperance. It is extremely obstinate in all these cases, and often produces more or less imperfection of sight, or even total blindness.

The chronic, like the other varieties of ophthalmia, is frequently accompanied with some pain and intolerance of light. These symptoms are, however, never very violent or of constant duration. The patient is often free from pain for the greatest part of the day, but is suddenly attacked with a paroxysm in the evening, which lasts several hours. The secretion of tears is more copious than natural at all times; but it sometimes comes on in violent paroxysm. When this is the case, the patient feels usually in the evening an uneasiness and itching of his eyes, which are soon followed by an overflowing of tears. These symptoms generally last the greater part of the night, and prevent sleep. The patient appears harassed in the morning, his eyes are weak, watery and suffused, and cannot bear even a feeble light.

As the ball of the eye has not regained its healthy appearance, the conjunctiva remains somewhat swelled and injected with red vessels. The eye-lids are also sometimes a little swelled, and the patient can seldom open them as freely as in health. This latter symptom is, no doubt, often owing to an increased sensibility of the retina to the impression of light; but I have observed it in cases in which that cause could not be suspected, and in which it appeared to be owing to a relaxation and inability in the muscles to raise the upper eye-lid, and to an effusion of serum into the cellular substance of the eye-lids.

If the watering and other symptoms continue some days, the red vessels of the conjunctiva shoot into the cornea. In some cases, the vessels advance only a short way over the cornea; in others, they pass in various directions over its surface, and are numerous and large. Sometimes they are in such quantity, and of such a size as to destroy the transparency of the cornea, and give it the appearance of a piece of liver. I have often suspected that a portion only of the red vessels, in cases of this kind, ran under the conjunctiva, and that another set of red vessels, came from the tunica sclerotica, and ran in the substance or along the inner surface of the cornea. I have often seen red vessels coming from the sclerotica, so deep seated in the substance of the cornea, or as I thought in some cases, running along its inner surface, that I could not divide them without cutting deeper into the sclerotica than could with safety be attempted. Is it not probable that it is by these vessels, which are pellucid and imperceptible in the healthy state, that the cornea is nourished and saved from mortification, when all the vessels running to it under the conjunctiva are divided by scarifications, or by cutting out a circular portion of that membrane?

As the discharge of a purulent-like matter from the conjunctiva and glands of the tarsi, is a frequent cause of ophthalmia passing into the chronic state, so it is a frequent symptom of this species of the disease. It is usually observed in cases of scrofulous persons, and in such is accompanied with a diseased state of the surface of the conjunctiva, and a thickening and ulceration of the tarsi. This discharge keeps up the inflammation of the eye, and I fear that by passing into the lachrymal ducts, it irritates and inflames them in some cases, and lays the foundation of fistula lachrymalis. If allowed to remain long in contact with the cornea, it corrodes its surface, or loosens its texture so as to render it more susceptible of ulcerating.

The eye is extremely liable in this species of ophthalmia to occasional accessions of more active inflammation. This is often brought on by the most trivial irregularity; but it is sure to succeed to exposure to the sun, cold night air, or intemperance in the use of intoxicating liquors. The dissipated mode of life, and the thoughtlessness of soldiers, expose them in a shocking manner to the influence of these causes, and it is now well known that when the disease has once assumed the chronic state in such persons, it is extremely difficult to bring it to a favourable termination. These accessions of inflammation produce a sense of scalding and grittiness of the eye, and increase the secretion of tears and intolerance of light. They are followed by the shooting of red vessels over the cornea, and the deposition of albuminous matter between its laminæ, or by partial suppurations and subsequent ulcerations of the surface of the cornea. The sufferings of the patient are very great during the time the inflammation lasts, and the eye is always rendered more watery and weaker by it.

It is necessary both with respect to prognosis and the method of cure, to understand clearly the difference between an opacity of the cornea arising from the shooting of red vessels over it, and the deposition of albuminous matter under the conjunctiva reflected over it, or in its substance; and that formed by cicatrization of ulcers, or in consequence of a rupture of the cornea. An opacity of the whole or a part of the cornea, is, as I have already mentioned, a symptom of the inflammatory stage of the virulent species of ophthalmia; but it is only the forerunner of suppuration, and always proves to be the seat of an abscess. The opacity of the cornea in the chronic state of the disease, is owing to the deposition of albuminous matter between its layers, or under the conjunctiva reflected over it, and perhaps to a thickening of that membrane, and does not always indicate the suppuration of the cornea. I may also observe that it is, in general, accompanied by the circumstance of a number of red vessels spread in various directions over the cornea. This latter kind of opacity of the cornea, is, I may say, in general removed by absorption; whereas that formed by the cicatrix of an ulcer, or in consequence of a rupture of the cornea, is permanent, and perhaps not to be diminished beyond a certain extent, by any mode of treatment with which we are acquainted.

Ulcers of the cornea are, as I have already observed, sometimes produced by accessions of inflammation. These ulcers are, in general, superficial, and few in number; but in some instances, they are so numerous as to render the whole surface of the cornea uneven. When an ulcer is situated near the circumference of the cornea, red vessels shoot into it in such abundance as to strengthen the eye at that part, and prevent its bursting. The cornea, however, sometimes gives way, when a deep ulcer is seated in the center of it, and the escape of the aqueous humour with its concomitant symptoms, follows. Sometimes a lamina of the cornea, to the extent of one half or a quarter of its surface, is removed by one accession of inflammation; and in some distressing cases, the cornea is totally destroyed by the successive separation of its laminæ, and the iris is laid bare. It might be supposed that the lens and vitreous humour would escape in every case of this kind; but this does not happen by any means frequently. It is prevented by the edges of the pupil growing together, and by the iris being soon covered over with a substance resembling the cornea, by which it is strengthened.

In some cases the cornea is so opaque as to have the appearance of being covered with a film. The opacity of the cornea, in all cases of this kind, which have fallen under my observation, was occasioned by a thickening of the conjunctiva, by a number of red vessels running under it, or in the substance of the cornea, and by the deposition of opaque matter in the interstices between them. I could never ascertain to my satisfaction, that there was a membrane, or a new growth lying over the surface of the cornea.

Excrescences on the surface of the cornea, in the site of ulcers, are sometimes observed in this, as well as in the second stage of the virulent species of ophthalmia. They are in general abundantly supplied with red vessels.

The chronic inflammation of the eye is kept up by every cause that irritates the eye, but it is not unfrequently kept up by the formation of sties, by ulceration of the tarsi, and by disease in the roots of the cilia.

I have often suspected that it was connected with a venereal taint in the constitution, without there being any affection of the bones of the orbit. I was led to adopt this opinion, from having observed some peculiarity in the appearance of the eye and character of the inflammatory symptoms, when this form of the disease occurred in persons labouring under secondary venereal symptoms, and more especially, when a venereal eruption on the skin formed one of them. Both eyes are generally affected; the patient complains little of pain, and still less of intolerance of light, and is not in fact conscious of any thing being wrong with his eyes, until the sight begins to grow dim. The eye is more watery than natural, but there is no great secretion of tears. The redness of the conjunctiva is not so vivid, as when the disease of the eye is unconnected with lues; the form of the pupil is sometimes irregular, or its edges are jagged, and the cornea is muddy in its whole extent, without any red vessels passing over it. Vision, as may be easily conceived, is totally lost for a time, or imperfect according to the degree of opacity of the cornea. This series of symptoms corresponds pretty well with the appearances of the eye in by far the greatest proportion of patients labouring under this complication of ophthalmia and lues; but the pain, weeping, and intolerance of light, go sometimes to a much higher degree. The inequality in the form, or jaggedness of the edges, of the pupil, will be found a pretty constant symptom; but I am apt to think, the opacity of the cornea, without any red vessels shooting over it, is the symptom the most strongly characteristic of a venereal taint being connected with the disease of the eye. There is in soldiers a peculiar expression of countenance, not easily to be described, which, in conjunction with the preceding symptoms, establishes in my mind the existence of a venereal taint in the constitution.

The connexion between the affection of the eye and lues, is rendered still more probable, by the fact of the opacity of the cornea disappearing, and the redness of the conjunctiva vanishing as soon as the venereal symptoms on the skin, or in other parts, begin to disappear.

I often observed that the lens was opaque in cases attended with the preceding symptoms; but I cannot say that I ever found mercury of any use in discussing the opacity.

TREATMENT.

The uncertainty, and often the inefficacy of any mode of treatment in this variety of ophthalmia, have, I am led to suspect, brought the cure of the disease into disrepute in the minds of many medical men; and the circumstances of its resisting all means in some cases, and of its yielding to various and opposite ones in others, has, no doubt, had a share in giving rise to the contradictory opinions on the modes of treating almost every species of inflammation of the eye.

It is impossible to lay down a settled plan of cure, because there is no leading principle on which to found it. Our efforts, then, must be directed towards curing other diseases, with which the affection of the eye is connected, and to removing and palliating particular symptoms.

As to what relates to the management of the eye itself, it will be always necessary to guard against an attack of active inflammation, and when this supervenes, to remove it by opening the temporal artery, and applying blisters in the manner already repeatedly pointed out.

It is in this variety of the disease in its purely chronic form, that dividing the vessels of the conjunctiva, is found productive of such good effects. This operation may be performed with the shoulder of a lancet, and as the object is simply to empty the turgid and relaxed vessels, it will be sufficient to draw the shoulder of the lancet once or twice along the conjunctiva on the under eye-lid. This being done, astringent or stimulant collyria may be used with decided advantage. Perhaps a collyrium of a solution of zincum vitriolatum, will be found as generally useful as any other. A small quantity of tincture of opium, camphorated spirit, or even brandy, may be added to it in a great many cases with manifest advantage. I have often found a mixture of tincture of opium or spirit and water, in the proportion of one ounce of the tincture to six of the water, answer admirably well. It will be necessary to increase the strength by degrees of any collyrium that is used, as all collyria lose their effect on the eye by long continued use. As much of the cure of this variety of ophthalmia depends upon collyria, it will be necessary to watch their effect on the eye, and to suit them to the state of each case, and the idiosyncrasy of each patient. I have used solutions of vitriolated zinc, of alum, and of vitriolated copper, by themselves, with great benefit; and I have often found their good effects much increased by the addition of a small quantity of tincture of opium or spirit. The eye will in some cases bear the application of verdegris, or a strong solution of corrosive sublimate; and it is but just to acknowledge that these violent applications are often of use when all others fail. The collyria just enumerated, will, I should suppose, answer every purpose to be expected from such remedies in this species of ophthalmia; but I see no objection to the use of many others of the same class. Collyria are sometimes recommended, composed of such a variety of ingredients, that I am apprehensive the persons who order them, are not sufficiently aware of the changes which take place during solution. One thing is certain, that the substance to which the good effects of many of these collyria are attributed, cannot exist in the solution, as it is decomposed by some of the others, and the parts of which it was composed, are withdrawn from the solution, by forming insoluble compounds with other substances. Many collyria represented as specifics, come precisely under this description. In the course of my observation on the treatment of this disease by others, I found that many of the persons who set the most value on collyria, and who boasted of the knowledge of particular formulæ of them, which, according to their accounts, surpassed all others in utility, knew little of their composition. It is true these gentlemen might give up the question of the composition of their collyria, and stick to the fact of utility; but this, to say nothing worse of it, is a very unchemical way of proceeding.

The best way of using collyria is with an eye cup; but an utensil of this kind cannot be procured in Egypt, nor even in Sicily. I directed each of my patients to be provided with a cup of earthen ware capable of containing about a pint, which served to hold his wash. He was also provided with a piece of fine sponge, with which he was directed to apply the wash to his eyes. The cups and sponges were washed in warm water by the orderly men of the hospital every morning. I may observe here, that as it was necessary to prevent the communication of the morbid matter of the eye from one patient to another, each man was provided with a washing basin and towel, and was strictly enjoined not to touch those belonging to others.

The watering or excessive flow of tears is most effectually removed by astringent or stimulant collyria, and by dropping some tincture of opium into the eye two or three times a day. I can recommend the latter remedy with much confidence. I do not know what share the opium has in the good produced, but I am certain that tincture of opium is vastly superior in efficacy to the spirit with which the tincture is made. On being dropped into the eye it produces a good deal of pain; but this is soon succeeded by a pleasant sensation. I have been sometimes obliged to continue the use of it for several days. When it does not however produce the desired effect in the space of a week, it is advisable to discontinue its use for a few days, and then commence it again. In some cases, in which both collyria and the tincture of opium failed, I have made an eschar with caustic over the eye-brow, and down along the outer angle of the eye. This certainly diminished the weeping in many of the cases in which I used it; and it appears to me to act by producing some change in the action of the lachrymal gland. I must acknowledge a fact, however, which militates strongly against this supposition, which is, that the weeping is very often increased by the irritation of a blister applied to the temple. When the patient's general health is much reduced, and the watering comes on in paroxysms in the evening, it will be necessary to bring into the assistance of the remedies just mentioned, bark, wine, and a generous diet. Opium is admirably calculated to palliate almost all the symptoms of chronic ophthalmia; but it is particularly beneficial in cases in which the overflowing of tears comes on in paroxysms. So difficult, however, is it to remove this symptom in some cases, that it resists all means as long as the patients are confined to an hospital; and we are often under the necessity of committing the cure of it to the effect of time, to change of air, exercise, and the re-establishment of the general health.

If the red vessels passing over the cornea be few in number, and do not extend to the part before the pupil, we may trust to astringent collyria and the effect of time for their removal. But if they be more numerous, and pass in all directions over it, and more especially, if they be so large and lye so thick as to destroy its transparency, it will be necessary to divide them with the shoulder of a lancet, or by cutting out a circular portion of the conjunctiva. As the object here is to cut off all communication between the vessels on the cornea and those of the other coats of the eye, it will be advisable to divide them as near the cornea as possible. The most effectual way of doing this is by cutting out a circular portion of the conjunctiva, which may be done in the way already pointed out. As to the red vessels which run, as I surmise, in the substance, or along the inner surface of the cornea, they are beyond our reach. Astringent collyria may be used after the operation of cutting out a portion of the conjunctiva.

The purulent discharge from the conjunctiva is in general dried up by the ordinary astringent collyria. I have often succeeded in removing this symptom with a collyrium of lime water. It will be necessary to bathe the eyes repeatedly in cold water for a great length of time after the disappearance of this symptom, in order to restore the lost tone to the conjunctiva and other coats of the eye.

I have employed various ointments to heal the ulcerations of the tarsi; I cannot say that I found any of them of much use. Caustic, if it be delicately and dexterously applied to the ulcerated point, is a good application; but, perhaps, the most convenient, and at the same time the most certain mode of healing them, is to touch them morning and evening with a crystal of the sulphate of copper.

With respect to opacity of the cornea, whether confined to a part, or extending over the whole of it, arising from the deposition of albuminous matter in its substance, and the other causes already assigned, it may be diminished, and its total removal forwarded, by keeping down inflammation, and by dividing the red vessels of the conjunctiva by scarifications, or by cutting out a circular portion of that membrane. If the opacity be confined to one spot, it will be sufficient to divide the vessels which are found running to it; but if it be general over the cornea, the shortest and most effectual method is to cut out a circular portion of the conjunctiva as near the lucid cornea as possible. The clearing of the cornea appears to be accelerated in some cases by the effect of mercury. I have not found any topical application to the cornea of use in removing this symptom. Its removal is to be looked for from cutting off the red vessels that supply the opaque matter, and by promoting absorption. Sometimes when the patient's health is much reduced, the opacity resists every measure used to remove it, as long as the patient is confined in an hospital; while it gradually yields to change of air, regular exercise, good diet, and other means conducing to the re-establishment of the general health. It will be often necessary, however, to use in conjunction with this plan, the means already recommended for the removal of the opacity.

Partial erosions or suppurations of the cornea may be prevented by keeping off active inflammation. When these affections take place, as they are always accompanied by more or less inflammation, it will be necessary to remove this by a small bleeding from the temporal artery, or by the application of leeches, and by blisters. The inflammation being subdued, the red vessels that are seen running to the ulcer, are to be divided, and astringent collyria are to be used. I have applied caustic in many cases to the ulcers occurring in this variety of ophthalmia, and it appears to me that the practice is much better suited to ulcers in this state of the disease than to those occurring in its acute forms. This remedy is admissible on no account until the active inflammation is subdued. When this is accomplished, the ulcers may be gently touched with caustic with advantage. It is quite sufficient to touch it once with the caustic. All that is required is to make a small eschar. This soon falls off, and the ulcer fills up in time to a level with the cornea. Sometimes in applying the caustic to the ulcer, the tears decompose it, and no impression is made on the ulcer. When this is discovered, it is in general deemed necessary to apply the caustic more freely, in order to secure its effect. I have sometimes seen the ulcer much enlarged by this mode of using the caustic. To secure, therefore, against these accidents, it will be necessary to dry the cornea first with a piece of fine sponge, and then to touch the ulcer gently with a piece of caustic, shaped so as to cover the whole of the ulcerated surface. It may be necessary to inject some tepid water into the eye after the operation.

The mode of treating excrescences in the site of ulcers of the cornea is obvious. It consists in cutting off the communication between them and the red vessels of the conjunctiva, and in destroying them with caustic to a level with the cornea. I must say, however, that I have not found any benefit result from this practice, but that of merely removing the excrescence. The opacity always penetrates very deep into the cornea. Films, or membranes growing over and obscuring the cornea, are enumerated among the diseased appearances of the eye. No case has come before me, in which I conceive I could be justified in taking a scalpel and dissecting off, or in corroding with caustic, a membranous growth over the cornea. I have already given my opinion as to the causes of opacity of this kind in the cornea; and I have much reason to suspect that when a membrane is said to be dissected off, it is the thickened conjunctiva which passes over the cornea that is removed. It is unnecessary, I suppose, to mention that the cornea never can recover its transparency after being stripped of this covering. The disease of the eye, known by the name of pterygium, exists sometimes to such a degree as to render the whole cornea impenetrable to the rays of light; but even in this case it cannot be said that blindness is produced by a film, as it is owing to the thickening and vascularity of the conjunctiva reflected over the cornea. I wish it here, however, to be clearly understood, that I do not confound pterygium with what have been called films of the cornea.

When the affection of the eye is accompanied by rheumatism, lues venerea, or any other disease, it will be necessary, in conjunction with the means calculated to remove these disorders, to have recourse to many of the remedies already recommended for the affections of the eye. In some cases of this kind, the injury threatened to the eye is so considerable, that if the method of cure of the other complaint do not conduce to the removal of the disease of the eye, it will be necessary to discontinue it and attend to the disease of the eye solely. This necessity frequently occurs in cases of a complication of syphilis and rheumatism with ophthalmia.

In cases in which the muddiness of the cornea, and other symptoms of chronic ophthalmia are connected with lues, the patients are to be put immediately on the use of mercury. As the object is to eradicate the venereal affection from the system, the mode of using the mercury, and the extent to which it is to be carried, must be regulated by circumstances. Mercurial frictions will, I believe, be found to answer better in warm climates than any other mode of using that medicine. If the muddiness of the cornea be accompanied with venereal blotches on the skin, it is found to diminish and at last disappear totally on the skin being cleared of the eruption. I cannot say that I have observed the opacity of the lens or its capsule to be diminished in the smallest degree by the use of mercury, though continued for a great length of time and pushed to a great extent. It is somewhat remarkable that the cornea is not cleared in any perceptible manner by making a circular incision in the conjunctiva, in cases attended with this species of opacity of the cornea.

I have not found it necessary, or even useful, to confine patients, labouring under this species of ophthalmia, to dark apartments. It is certainly improper to allow them to expose themselves to a vivid or strong light, or to use their eyes in exercises which fatigue them much. I have every reason, however, to think, that a moderate light is by no means hurtful, as long as there is no active inflammation present. When a patient is shut up for a length of time in a dark room, his eyes are necessarily irritated every time he comes into the light, but if he be allowed to walk about the hospital with a green shade over his eyes, he can keep clear of too strong a light; and the eye, by being always exposed to an impression of the same strength, is not irritated by sudden transitions from a feeble to a vivid light. Besides, it often happens in the best constructed hospitals at home, but more especially in the buildings employed as temporary hospitals on foreign service, that the means which are used to exclude the light, will exclude also the fresh air; and hence patients, shut up in the darkened wards of an hospital, are placed under the necessity of living in a confined and contaminated atmosphere. As the recovery of patients in this disease is, in general, very slow, a long confinement in hospital is inevitable; and if this time be spent in inactivity, and in the impure air of a gloomy cell of an hospital, nothing is more likely to impair the general health. Indeed, it is not unusual to find the health of many patients so much reduced by long confinement in hospital by this disease, that the cure of it is protracted and rendered difficult by this circumstance. Hence it becomes a matter of great importance to protect the general health in cases in which there is no general infirmity or constitutional disease; and if it be necessary to observe these precautions in instances of this kind, how much more urgently are they called for when the disease is to be treated in persons who are naturally weak and delicate, or in those who are enfeebled by other complaints? Finding that exposure to a moderate light did not injure the eye, and that every other consideration of the subject was in its favour, I directed my patients to walk about with a green shade over the eyes, for a great part of the day, in the long and spacious gallery of the convent converted into an ophthalmic hospital in Sicily. I doubt much, if an hospital was constructed on purpose for ophthalmic patients, that it would by any means answer the proposed end so well as this convent. The only change that was necessary to make in it was, to give the walls a grey colour, as the reflection of light would be too strong were they allowed to remain white. In the absence of the patients from the wards, the doors and windows were thrown open, and the wards were cleaned out. Notwithstanding these precautions, the health of some patients was much impaired by the confinement, and the disease of their eyes seemed to continue stationary as long as they remained in hospital.

When chronic ophthalmia occurs in persons of a scrofulous habit, and proves obstinate and tedious, it will be often necessary, in addition to the remedies used directly for the eyes, to have recourse to tonic medicines, generous diet, and sea-bathing. Even this plan of treatment is not always successful as long as the patient remains in hospital; but it often proves successful when seconded by exercise and change of air.

All topical applications to the eye prove frequently of no use in cases of patients convalescent from other diseases. The great object in all such is, first, to re-establish the general health, and the cure of the ophthalmia is afterwards, in general, easily effected.

Cases seldom occur which require the application of all the means suggested in the preceding observations. When such, however, present themselves, the period of the disease, adapted to the use of each remedy, and the order of succession in which the various means are to be brought into use, must be selected according to the judgment and experience of the person who orders them.

I have now to observe that time alone often effects in chronic ophthalmia what cannot be accomplished by the utmost exertions of human art. I fear that we sometimes carry our assiduousness in the application of remedies to a culpable degree. I am led to believe that too much interference with the eye, and especially the too frequent use of scarifications, and the too free application of caustic, or the use of too strong stimulant or astringent collyria, have often kept up the redness, watering, and other marks of chronic inflammation of the eye, and that the disease has been rendered more obstinate and unmanageable by the too free use of these means. When, therefore, we find that our remedies, after a trial for a certain length of time, do not produce the desired effect, it will be advisable to desist from their use for some time, and to trust, during the interval, to the cleanliness and repose of the eye. The subsequent effect of stimulant or astringent collyria, and, in fact, the effect of every remedy calculated to remove the disease, is much increased by a cessation of this kind. I candidly confess, that I have been obliged, from downright want of success, to desist altogether in some cases from interfering with the eye, and to commit the chance of recovery of the patients to the effect of time, and to their own precautions in guarding against every thing likely to aggravate their disease. The result was often much more favourable than could have been well expected in such unpromising cases. I have often, with much satisfaction, observed that ulcers on the cornea which appeared stationary, red vessels of the cornea which could not be obliterated, and opacities of the cornea to a greater or less extent and density, which resisted every means, have all come to a happy termination in time when the patient was committed to the efforts of nature. The appearance of the eye improved, with the re-establishment of the general health, without the aid of any one topical application to the eye. It will be often, however, necessary to give seasonable assistance to the efforts of nature, in order both to accelerate and perfect the cure. Even cicatrices of the cornea which threatened at first to cause permanent blindness, have diminished in extent and density by time, and as much sight as been regained as enabled the person to perform many of the active duties of a soldier. These fortunate results were always accompanied, I might say, brought about, by the re-establishment of the general health.

One useful lesson may be taken from a knowledge of these facts, which is, that soldiers apparently incapacitated for service by ophthalmia, ought not to be hastily discharged. This rule is strictly applicable to cases in which the obstruction to vision arises from an opacity of the cornea produced by a number of red vessels shooting over it, or by the deposition of albuminous matter on its substance. The total destruction of the cornea, large dense cicatrices seated before the pupil, the obliteration of a great part of the pupil, and opacity of the lens or its capsule, are all evils of so great magnitude, and most of them so far beyond the assistance of art, that soldiers afflicted with these calamities may be fairly and safely pronounced as unfit for service.

It may be easily deduced from what has been said on the origin, symptoms, and treatment of this species of ophthalmia, that the atmosphere and inactivity of an hospital life, are extremely unfavourable to the cure of it. A disadvantage in the cure and management of military patients, which seldom occurs in practice in private life, arises out of this circumstance. The soldier, if he be not confined in an hospital, must reside in his tent or quarters, where, with the best intentions possible, admitting that he is exempted from duty, he can do but little for the recovery of his eyes; but if he be obliged to do his duty, even this little becomes impracticable, and he is exposed to fatigue, want of rest, vicissitudes of weather, in short, to every cause likely to aggravate the diseased state of his eyes. On the other hand, if he be exempted from duty, unless he be a prudent and correct man, the probability is, that he indulges in intemperance, and thus adds to his disease; or, at best, takes none of the precautions suggested by a just notion of the nature and danger of his situation. Army medical men are often compelled, by considerations of this kind, to detain ophthalmic patients in hospital much longer than they would otherwise do could they rely on their prudence and care. Even when every thing has been done to cure the disease, and every precaution taken to secure against a relapse, such is the thoughtlessness of soldiers, and so strong is their love of wine, that they often do away, in one fit of intemperance on the very day on which they join their regiment, all the advantages resulting from months of previous care and attention. I have seen, to my great annnoyance, many a relapse produced in this way in persons who had not a single symptom of the disease for six months before.

PART II.

OF THE CONSEQUENCES OF OPHTHALMIA.

It sometimes happens, after the inflammation of the eye is totally subdued, that a disease or derangement of the eye-lids remains, which produces deformity, or keeps up a diseased action of the coats of the eye, and, in that way, lays the foundation of injury to the sight. It also occasionally happens that an affection of the globe of the eye itself remains which impedes vision.

But, before entering on the consideration of any of the above diseases of the eye, it may not be amiss to say a few words on the subject of relapses of ophthalmia, (though they cannot perhaps in strict propriety of language, be admitted as consequences of that disease,) with the view of tracing their most prevailing causes, and of suggesting the most probable means of preventing their occurrence.

CHAPTER I.

Of Relapses.

The tone and action of the vessels and coats of the eye are deranged by the inflammation which always forms a symptom of ophthalmia, and the action of the lachrymal glands is much increased by the sympathy existing between them, the retina, and other parts of the eye. Hence it arises, that when the eye has once suffered from inflammation, it remains tender and watery for a length of time; and it acquires a susceptibility of being inflamed by a very slight degree of action of any of the exciting causes of ophthalmia. It is difficult to say when this susceptibility ceases. It is evidently much stronger, and lasts much longer, in some persons than in others. I have observed that several of the patients who have been attacked with ophthalmia within the last three years in Sicily, had suffered from the disease in Egypt in the year 1801. What I wish, however, to be understood by a relapse is, a second attack of inflammation of the eye occurring within a few months after the disappearance of the first. I have every reason to think that the eye remains tender and weak for a much longer time in some cases; but, I am sure, that when it is once weakened by inflammation, a relapse may be brought about at any time within six months from the period of the first attack, by causes that would not inflame it were it not rendered highly susceptible of inflammation by the antecedent disease.

The susceptibility of the eye to a relapse of the inflammation is much stronger in irritable, delicate, and scrofulous constitutions than in others. It seems also to be increased by a natural local debility of the coats and vessels of the eye, and by the defects in the cornea and iris, which are sometimes produced by a violent inflammation. It is much stronger after repeated attacks of inflammation than after a first one; and it prevails in a much higher degree and lasts much longer after an attack of the virulent species of ophthalmia than after that of the milder form of the disease. Thus, unfortunately, the inflammation lays the foundation of its own return, and the permanency and obstinacy of its symptoms being, in general, proportionate to the number and violence of the attacks, it often happens that one relapse speedily succeeds to another until the eye is ultimately destroyed, or the disease assumes the chronic state. The soldier is often, under the best management, incapacitated for the service in this way, or he is brought to that state in which he is rendered unfit for the active duties of his station for a great length of time.

Hence it follows, that when ophthalmia has once made its appearance to a considerable extent in a regiment, its tendency to relapse and to pass into the chronic state keep up its prevalence in that corps for a great length of time, independently of the circumstance of its spreading by contagion. It appears, from this view of the subject, that the eradication of the disease is not to be effected in a short time by any plan hitherto adopted, and that it is in vain to look for this solely from changing the quarters of regiments, or moving them from one place to another, a very favourite measure with military men. This certainly has its advantages, as, by a proper selection of quarters, the men may be placed in situations in which the causes of the disease exist in less force and abundance than in others; but the final extinction of it is not to be accomplished without judicious arrangements as to the quarters and duties of the men, and much patience and perseverance on the part of the military and medical officers in their efforts both to prevent and cure the disease. This opinion is not founded on speculation; it rests on the solid basis of experience. I have witnessed what I here relate in many regiments in Sicily, but the history of the 21st Regiment of Foot furnishes the strongest confirmation of it. Ophthalmia, in all its forms, was very prevalent in this corps in Egypt, and for some time after its return to Sicily. A case of the disease now rarely occurs in it. This, though it is highly flattering to the medical men of that regiment, is not entirely owing to their exertions. Medical men in the army have little more to do than undertake the cure of such diseases as come under their care, and many valuable lives are, no doubt, saved to the army and to society by superior professional abilities; but let these abilities be ever so transcendant, and the exertions of medical men ever so indefatigable, they will be unavailing and insufficient to eradicate a prevailing disease from an army or regiment unless they are seconded by equally judicious and strenuous exertions on the part of the persons in whose hands are placed the direction and management of every thing relating to the prevention of disease and to the maintenance of the general health of the army. The eradication of ophthalmia from the 21st Regiment is to be attributed to the judicious and energetic measures of the intelligent and active officer commanding that corps, and to the great attention paid by all the officers of the regiment to every thing connected with the health and conduct of the men.

Relapses sometimes occur in hospital without ever being able to trace them to any cause. They are often accompanied by catarrhal symptoms, and, consequently, may be fairly referred to the action of cold. I have frequently observed relapses take place in patients in hospital who slept near a window, or between a door and window;

and on board ship when they slept near port-holes or hatchways. I concluded, from these circumstances, that a current of night air over the head was the cause of the relapse. The same cause will necessarily affect soldiers when they sleep in their barracks or tents, as they are more exposed to it than when they are in hospital. By far the greatest proportion of relapses is brought about in soldiers by putting them too soon to duty, by intemperance, and by a total indifference and inattention, on their part, to all the existing causes of the disease. All that I have said on the effect of intemperance, in producing and aggravating ophthalmia, will apply, with double force, to the subject of relapses. It is painful to be obliged to recur so frequently to this cause, but I fear it would be altogether impossible to give an adequate description of ophthalmia without taking it into account.

Perhaps it is now incumbent on me, after having railed so much at the predominant, if not the only failing of our soldiers, to endeavour to point out the source from which this evil arises, with the view of saving the poor soldier's character from a heavier imputation than it merits, and of lightening the censure which, no doubt, many persons, as well civil as military, will pour out very freely on myself for bringing the subject before the public. I found the justification of my conduct, on this occasion, on the motives which led to it, and I hope to establish no small extenuation of the offences with which I charge the soldier by taking a view of the circumstances under which he is placed.

It need not be said, I suppose, that the private soldier, in Great Britain, is taken from the lower class of society, and generally from the most indolent, dissipated, and thoughtless of that class. The observance of nice rules of conduct, or much reflection on the advantages or disadvantages of particular lines of conduct, are not to be expected under any circumstances from such an individual. As soon as he enters the army he engages in a mode of life proverbially unfavourable to care and thought. The few objects on which he was accustomed to exercise his feeble mind no more present themselves, and the only thing that forces itself on his attention is the necessity of implicit obedience to military laws. As he has, ready furnished to his hand, every thing in the limited scale of his wants, he no longer sees the necessity of accommodating his manner of living to a standard set up by others, or to trouble his mind or body about the affairs which formed before the daily objects of his care and thoughts. His situation, independently of all this, is, in itself, extremely unfavourable to reflection, and holds out little inducement to pursue the steady and sedate line of conduct which brings such advantages with it in civil life. The soldier is always on the move or in a bustle, and either in actual danger or expecting to be so every moment. Thus seldom disposed, and often prevented by the tumultuous and precarious life he leads, to extend his views beyond the present day, and having no taste for refined pleasures or amusements, he runs into excess in his hours of relaxation from duty, and considers the temporary exhilaration produced by wine as one of the great comforts of his life. Unfortunately, the too frequent recurrence to this practice leads to the most distressing consequences; but we all must allow that it is, at most, but a failing which arises out of the levity, *nonchalance*, and dangers of a military life. I have no reason to think that the British soldier sins more in this respect than the soldier of any other nation, but even if he does, he makes more than ample amends for it by surpassing the soldier of every other country in a high national spirit, intrepidity, and every other valuable military quality. The evil of which I here complain, as it arises out of the peculiarity of a purely military mode of life, must exist to a greater or less degree in every army in Europe; and I believe it is known to be as prevalent in the French army as in any other. I cannot say how far the suppression of the practice in our army would tend to elevate its military reputation, but I have no doubt of its contributing much to the health, and, consequently, to the efficiency of the army. As it appears to be so intimately connected with a military mode of life, it will require, in the person who undertakes the arduous task of reforming it, much perseverance and firmness of mind, and a familiar acquaintance with the habits and frame of mind, and feeling of soldiers.

The susceptibility of the eye to inflame from the slightest cause, for a long time after an attack of ophthalmia, suggests the propriety of not putting convalescents from the disease hastily to military duties, and the negligence and thoughtlessness of soldiers point out the necessity of placing convalescents under the controul and care of persons capable of forwarding their recovery and regulating their conduct.

The plan followed with the convalescents from the disease in Sicily has, perhaps, as much to recommend it as any other which has been hitherto adopted.

The convalescent, on being discharged from hospital, is removed to a spacious well ventilated building, fitted up on purpose for the reception of such persons. Here he is given in charge to a military and a medical officer, and he is in every respect as well accommodated and attended as he was in hospital. He is allowed his full ration of bread, meat, and wine, unless the medical officer see something in his case which will justify him in withholding the wine. As soon as he appears likely to be benefited by exercise, he is obliged to walk out in the open air, with a shade over his eyes, for such length of time as may be thought useful to him, under the command of a commissioned officer. The moment a relapse is discovered, and from the vigilance observed, such an event can exist only a short time without being detected, the patient is immediately sent back to the ophthalmic hospital, which, I may observe, is distant only a few hundred yards from the building occupied by the convalescents. But if all things go on well with the convalescent, and his eyes gain strength, he is selected out by a medical officer and transferred to another convalescent establishment which is some miles distant from the former. Here he is also comfortably accommodated and placed under the care and controul of a military and medical officer; but he is allowed to walk about a great part of the day at his own discretion, and he is occasionally exercised in marching, and other military employments. In this way his general health is improved, his eyes regain strength, and he is gradually habituated to exercise in the open air, and to the occupations in which he is to be afterwards employed. It is, among other things, the duty of the medical officer to see that the military discipline to which the convalescent is subjected be suited to the state of his eyes and general health. The convalescent is sent from this latter establishment to join his regiment, but not without being previously selected by a medical officer as a fit subject to be discharged.

The advantages resulting from this plan might be predicted from a knowledge of the disease and the habits of soldiers; and I have no hesitation in saying that they will more than equal a reasonable expectation. Its good effects were not confined to patients purely convalescent. The same mode of management adopted with many patients in whom the disease had assumed the chronic state, and for whom little or nothing could be done in hospital, was found to be attended with manifest advantages, without the assistance of any topical remedy to the eye, or internal medicine. It will be often necessary, however, to contribute to the improvement of the eye by the ordinary remedies on such occasions, and to attend also to the means calculated to accelerate the re-establishment of the general health.

It may appear, from a superficial view of this mode of managing convalescents from ophthalmia, that it is attended with the disadvantage of keeping soldiers too long from their duties. An objection of this kind can never present itself to a medical man, and can arise only in the minds of military men, who, as may be expected, can be but little acquainted with the nature and danger of the disease and its tendency to return. One would suppose, however, that it required no extraordinary sagacity in a military man to discover the means by which he might satisfy himself as to the advantages of the measure; or, failing in that, it might reasonably be expected that he would be guided in his conduct by the opinions of his medical advisers. Two things are implied here, one a mind capable of inquiry, and the other, deference to the opinion of a person who is supposed to know nothing of military affairs, which are not always met in military characters, and which are to be found only in persons accustomed to the investigation of truth, and in those possessing a well disciplined and cultivated mind. For my part I have ascertained to my satisfaction, that the number of relapses was diminished in proportion to the strictness with which the preceding rules were observed; and that from the day on which they were first carried into effect to the present time, the number of recent cases of attack diminished gradually; from which it may be fairly concluded that the strength of the army has been increased, and the number of men lost to the service, very considerably diminished by them.

The establishment of an hospital for opthalmic patients solely, and a system of arrangement for convalescents, such I have just described, answer all the purposes of cure, and many of those of prevention. If the disease be contagious, it is prevented from spreading, by the patient being instantly removed from his regiment, and confined in an hospital set apart for his disease, and by not being allowed to return to his corps, or to engage in the duties of a soldier, until he is perfectly recovered. If it be propagated by the contact of infectious matter, the source of this is cut off by the separation of the patient from his regiment, and from all persons (the medical and other attendants excepted) not labouring under the same disease as himself: And lastly, the treatment of the patient is better conducted, by giving him in charge to persons whose sole business it is to attend to him; and the cure is confirmed, and security against relapses gained by confining him to a proper system of diet and exercise, and keeping him at the same time out of the sphere of action of many of the exciting causes.

CHAPTER II.

Of Ectropium, or Eversion of the Eye-lids.

An eversion of the eye-lids, as I have already mentioned in another place, sometimes occurs in the inflammatory stage of the virulent ophthalmia. This symptom generally disappears with the resolution of the inflammation. The eversion of the eye-lids, which I propose taking into consideration in this place, is that which remains after all the inflammatory symptoms have disappeared. This affection, as far as has fallen under my observation, is by no means frequent among soldiers; and when it does occur in persons of this description, it takes place generally in the under eye-lid only; and it is a consequence of a violent inflammation of the eye and palpebræ. It is occasioned at first by an effusion of fluid into the cellular substance under the conjunctiva, and by a thickening of the conjunctiva itself, and the subjacent cellular substance. All these circumstances, together with the eversion of the eye-lid, take place during the inflammatory stage of the disorder; and by continuing after the inflammation, and being aided by the relaxation of the muscles, they constitute the disease of which we are here treating.

Some persons are much more liable to an eversion of this kind than others. This appears to be owing to a natural flaccidity of the eye-lids, or to the palpebræ being more liable in some individuals than in others to be weakened and relaxed by repeated attacks of inflammation. Persons who have suffered from excoriations of the edges of the eye-lids, or ulcerations of the tarsi, or those with the characteristic marks of scrofula in the eye-lids, are particularly liable to it. It is also much more likely to happen to persons who have suffered from repeated attacks of ophthalmia, than to those who have had the disease more rarely.

An eversion of the under eye-lid, the only one I consider here, causes much deformity, is productive of much inconvenience, and is a fertile source of danger and irritation to the ball of the eye. It occurs in various degrees from a slight inclination outwards of a portion only of the tarsus, to a total eversion of a part or the whole of it. Sometimes the eye-lid is turned out only so much as to remove the tarsus to a certain distance from the ball of the eye; while in others the tarsus is turned completely downwards, and the everted conjunctiva forms an arch, the center of which is much elevated.

If the eversion be considerable, a large portion of the conjunctiva is necessarily exposed to the air, and its surface becomes villous, and acquires an unusual hardness and roughness. Sometimes purulent matter is secreted on the surface of the conjunctiva, or small ulcerations are formed on it. As the tears cannot make their way to the punctum lachrymale of the everted eye-lid, they flow over the cheek, and by being copious and mixed with the purulent matter, they irritate the skin of the parts over which they pass. The ball of the eye by being deprived of so much of its natural covering, is preternaturally exposed to the impression of air and light, and to the irritation occasioned by dust and the friction of the villous and indurated conjunctiva. Hence this affection of the eye-lid keeps up a tenderness and watering of the eye, and thus independantly of the deformity and inconvenience it occasions, claims attention on the grounds of preventing further mischief to so valuable an organ.

TREATMENT.

Astringent applications, bathing the eye repeatedly in cold water for a length of time, and supporting the eye-lid with a compress and bandage, are sometimes adequate to restore to the relaxed and distended parts their lost tone and position. This will be found to be often the case when the eversion is only partial, and not of long standing; but a similar event cannot be expected from the same means, when the eversion of the eye-lid is complete, and the diseased state of the conjunctiva considerable and of long duration. I have sometimes succeeded in cases of this description, by making two or three deep longitudinal scarifications, parallel to one another, between the edge of the everted tarsus and the ball of the eye, and by eliciting as much blood as possible from the incisions by bathing them with tepid water. As soon as the bleeding ceases, the everted eye-lid is to be turned up, and being restored to its natural position, and placed in contact with the other, the palpebræ are to be covered with the cataplasma aluminis, and secured by a bandage properly applied. It will be necessary to renew the cataplasm every three or four hours, and to attend to the just opposition of the eye-lids at the time of each change. There is seldom any necessity of repeating the scarifications, but the other parts of the practice must be steadily persisted in for five or six days, at the expiration of which time it is often found successful. It is by no means, however, so expeditious or certain as that of destroying the diseased portion of the conjunctiva by caustic. I should therefore recommend having recourse to this latter measure in all cases of eversion of long duration, and especially in those in which the thickening and induration of the conjunctiva and cellular substance are considerable. When this mode of treatment, then, is determined on, the everted eye-lid is to be turned out as much as possible, and the whole of the diseased portion of the conjunctiva (carefully avoiding the punctum lachrymale) is to be freely touched with caustic. After this is done, the surface of the conjunctiva is to be carefully dried with a piece of fine sponge, which by absorbing the tears, and the dissolved caustic, prevents injury to the other parts of the eye. The use of the caustic is to be persevered in, with an interval of a day or two between each application, until the diseased portion of conjunctiva is destroyed, and the eye-lid regains its natural position. It will contribute much to complete and accelerate the cure to support the eye-lid with a compress and bandage for some time after the caustic is discontinued; and to bathe the eye repeatedly in cold water, or a weak solution of alum. This method of treating the disease, though apparently rough, and likely to produce pain and inflammation of the ball of the eye, is not attended by as much pain as might be expected, and very rarely causes any considerable inflammation of the eye. It is seldom necessary to use any wash, but a weak solution of cerussa acetata, or simple water, during the intervals of the application of the caustic.

No case has fallen under my observation, in which one or other of the means which I have now proposed, did not answer fully the purpose to be expected from it. I have therefore never found it necessary to dissect off the diseased portion of conjunctiva.

I may observe here, however, though somewhat out of place, that I have occasionally met with cases of ophthalmia, in which I discovered small, hard and rough tumours in the conjunctiva lining the eye-lids, which by pressing against the ball of the eye, and riding on it in the motion of the eye-lids, caused much pain, and kept up the inflammation of the eye. I have never hesitated in removing them by dissection, and I have uniformly found a diminution of all the symptoms of the affection of the eye to follow the measure.

CHAPTER III.

Of Entropium, or Inversion of the Eye-lids.*

I CANNOT say that I have ever seen this affection of the eye-lids attend a violent inflammation of the eye, or come on as a consequence of it. I have often, however, found the tarsi turned inwards on the ball of the eye to a greater or less extent, in persons who have suffered much from ulcerations of the tarsi, or repeated attacks of chronic ophthalmia. The flaccidity of the eye-lids accompanying old age seems to favour their inversion very much. In some of these cases, the eye-lids of one or both eyes are inverted in their whole length; in others the inversion is confined to a portion only of the tarsus of one or both eye-lids. I believe inversions partial or general of the under eye-lids are much more common than those of the upper.

---

* I use the term *entropium*, and not *trichiasis*, because the former signifies simply inversion; and the latter implies hair, and by common consent, an inversion of the cilia, which though necessarily following an inversion of the tarsus, may take place without any derangement in its position. Now in every case that has occurred to me the tarsus was turned inwards on the ball of the eye.

I have had patients in ophthalmia occasionally under my care, who had an inversion of the under eye-lid of one eye previously to the attack of inflammation; and as might be expected, I found the inflammatory symptoms considerably aggravated by this circumstance. The inversion in these cases was produced by a cicatrix of the conjunctiva lining the under eye-lid, occasioned by the destruction of a portion of that membrane by lime that fell accidentally into the eye.

In all cases of inversion of the eye-lid, the whole or a portion of the tarsus loses its horizontal position, and is turned in on the ball of the eye. The pain, inflammation, and watering of the eye, produced by the riding of the cilia on its coats, in every motion of the eye-lid or ball of the eye, must keep the patient in a constant state of distress and annoyance.

TREATMENT.

If a small portion only of the tarsus be inverted, and the patient be advanced in life, and more especially if he be liable to suffer from ulceration of the tarsi and disease in the roots of the cilia, and chronic inflammation of the eye, perhaps it will be advisable to decline an operation, and to trust to topical astringents healing the ulcers of the tarsi, and other means of a palliative cure. I have seen considerable relief given in some cases of this kind by a similar mode of treatment. The tarsus was brought nearly to its natural position, and as long as the patient remained free from inflammation, and congestion of the edges of the eye-lids, he suffered little or no inconvenience; but as soon as these symptoms appeared, the eye-lid lost its tone, and the tarsus turned into a greater or less extent on the ball of the eye.

In cases, however, in which the inversion of the tarsus is more extensive, whether brought about by the preceding causes, or a cicatrix of the conjunctiva, in consequence of the destruction of a portion of that membrane by lime or any other corrosive substance, it will be necessary to perform an operation on the eye-lid in order to effect a radical cure. I may observe that all attempts at remedying an affection of this kind, by confining the eye-lids to their natural position by adhesive plaster, are totally useless; and that all endeavours to palliate the sufferings of the patient by destroying the eye-lashes, are both cruel and ineffectual.

When, then, an operation is determined on with the view of remedying the inversion of a part or the whole of the tarsus, a longitudinal portion of the skin of the eye-lid is to be cut out, in a line parallel with the inverted tarsus, from one end of the inversion to the other. By seizing the skin with a forceps, or between the thumb and fore-finger, exactly at the center of the inversion, and raising it up, the inverted tarsus will be brought to its natural position, and the quantity of skin necessary to be removed will be thus clearly ascertained. If the incision be now made in the skin raised in this way, a larger portion of the integuments will be removed from the point corresponding with the center of the inverted tarsus, than at the extremities of the incision, by which we follow what is pointed out by the folding of the skin in a healthy state of the eye-lid. The best instruments for performing this operation are a forceps and a pair of curved scissars. In cases of inversion of the eye-lid from cicatrices of the conjunctiva, it will be necessary, before touching the external part of the eye-lid, to divide the cicatrix freely with a scalpel, or the shoulder of a lancet.

As soon as the bleeding from the wound in the eye-lid has ceased, its edges are to be brought into contact, and if the incision has been properly made, the tarsus will be found restored to its natural position. As the cure depends entirely on the proper union of the sides of the wound, I think it advisable to secure their close approximation by one or two stitches, according as the length of the incision may require. Adhesive plaster is not always sufficient to keep the sides of the wound in close contact; and in many cases the tears get under it, and prevent its adhering to the skin. Even when adhesive plaster is assisted by the pressure of a compress on the eye-lids, it does not always answer; for it is extremely difficult to keep the eye-lids motionless for any length of time: and if the eye-lid on which the operation has been performed be allowed to move to any extent, the tarsus turns in as before, the sides of the wound are necessarily separated, and the operation is not productive of the smallest benefit. When stitches are used, a piece of lint covered with any mild dressing is to be laid over the wound, the eye-lids are to be closed, and a compress of lint laid over them, and the whole is to be secured by a bandage applied round the head and face. If one eye only be operated upon, will be necessary to keep the other closed with a compress placed over it for two or three days. By adopting this precaution, we contribute to the composure of the eye-lid on which the operation is performed, as the motion of one eye is accompanied by a corresponding one of the other. On removing the dressing on the second or third day, the wound is in general found united, and the tarsus restored to its natural position. In some cases there may be a little swelling of the part, which gives an appearance of the cure not being complete; but this disappears in a few days, and the eye-lid presents no mark of disease but a small scar on the site of the incision, and even this diminishes so much by time as to produce scarcely any deformity. After the dressings are removed it will be necessary to use an astringent wash for some time, and to avoid every cause likely to inflame or irritate the eye. The conjunctiva continues red for a few days, but this is oftener owing to the previous rubbing of the cilia on the ball of the eye, than to the operation on the eye-lid. I have never observed much inflammation or pain of the eye, or much tension or swelling of the eye-lid, or in fact any dangerous or unpleasant consequence result from the operation when performed in the way I have just described.

CHAPTER IV.

Of Pterygium.

The nature of this affection of the eye is now pretty clearly understood. It consists of a plexus of vessels running from the white part of the eye under a thickened portion of the conjunctiva to the cornea, and occupying a greater or less portion of its surface. It is somewhat extraordinary, that when it has advanced any way on the cornea, it has always a distinctly marked triangular shape, the apex of which points to the cornea. This is even perceptible in its incipient state, when it appears just beyond the confines of the sclerotica. I have met with many incipient cases of pterygium in soldiers, but with only one in which the opaque membrane had advanced so far over the cornea as to obscure one half of the pupil. The incipient cases were evidently brought on by chronic ophthalmia; but I could get no satisfactory account of the formation of the other. The patient said it was of a number of years standing.

This disease in its incipient state is not of itself productive of any pain, inconvenience, or loss of sight; but in many such cases I believe it will be found to be accompanied by a chronic inflammation of the globe of the eye. It is only when it reaches before the pupil, and impedes vision, that serious inconvenience is felt from it.

I cannot say that I found any peculiarity of constitution to favour the formation of this disease, or any circumstance to conduce to it but a chronic inflammation of the eye. I observed, however, in some cases, a small yellow or buffy prominence on the sclerotica at the internal angle of the eye, before the pterygium manifested itself in its regular form on the cornea. If it be hereafter proved that this prominence indicates a beginning pterygium, it may be advisable to cut it out, and thus arrest the disease *in limine.*

Pterygia are described as approaching the cornea from various points of the globe of the eye. I have never seen any in cases of soldiers coming from any part but the internal angle of the eye. They are also said to be sometimes of a carcinomatous nature. I have never witnessed any thing of this kind among military patients.

TREATMENT.

As soon as a pterygium appears regularly formed on the cornea, let it have advanced ever so short a way on its surface, there can be no doubt of the propriety of destroying it. If the operation be performed at this early stage of the disease, the cicatrix that remains from the loss of the portion of conjunctiva, will be very trifling, and the sight will be secured against any future injury from this cause.

The instruments required for this operation are a small forceps and a pair of scissars. The pterygium is found to corrugate by the motion of the eye and eye-lids, so that a portion of it may be easily seized by the forceps. This being done, the whole of the opaque substance is to be removed by a cut of the scissars from the cornea, and the incision is to terminate at the junction of the cornea with the sclerotica. There is no use in removing the diseased portion of the conjunctiva from the sclerotica, as it cannot impede vision at that part, and there is no danger of the disease returning. A small cicatrix of the cornea remains, and if it be not seated before the pupil, it does not affect vision in the smallest degree. It will be necessary to keep the eye covered with compresses, wet with a solution of sugar of lead for one or two days after the operation. I have never observed a violent inflammation of the ball of the eye, or any one unpleasant or dangerous consequence follow this operation.

FINIS.

ERRATA.

Page 1, line 10, for desease, *read* disease
9, line 7, for molleculœ, *read* molliculœ
13, line 14, for evacution, *read* evacuation
14, line 21, for of crystaline, *read* of the crystaline
38, line 5, for remained, *read* remain
46, line 1, for percieved, *read* perceived
50, line 28, for cillary, *read* ciliary
51, line 10, for embarassing, *read* embarrassing
55, line 9, for to the iris, *read* to the lens
58, line 18, for affected, *read* effected
62, line 27, for accordinly, *read* accordingly
63, line 8, for statisfactorily, *read* satisfactorily
65, line 22, for floccullœ, *read* flocculœ
103, line 4, for apeture, *read* aperture
110, line 13, for extremeties, *read* extremities
114, line 23, for subservent, *read* subservient

PRACTICAL
OBSERVATIONS
ON
DISEASES OF THE EYE.

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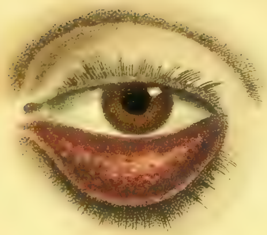

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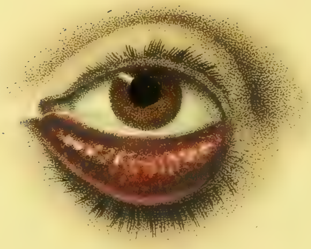

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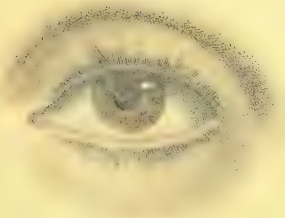

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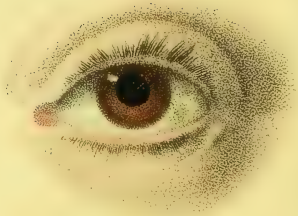

1 David Crommies Eye
previous to the operation
2 The same Eye
a fortnight afterward.

3 Mr. Menzie's Eye
previous to the operation
4 The same Eye
after the disease was cured.

Engraved by J.E

Published May 28th 1812, by Callow, Crown Court

PRACTICAL OBSERVATIONS
ON
ECTROPIUM,
OR
EVERSION OF THE EYE-LIDS,
WITH THE
Description
OF A
NEW OPERATION
FOR THE CURE OF THAT DISEASE;
ON THE
MODES OF FORMING
AN ARTIFICIAL PUPIL,
AND ON
CATARACT.

ILLUSTRATED WITH COLOURED PLATES.

BY WILLIAM ADAMS,

Member of the Royal College of Surgeons in London;
Oculist Extraordinary to His Royal Highness the Prince Regent;
Oculist in Ordinary to their Royal Highnesses the Dukes of Kent and Sussex;
And late Surgeon to the West-of-England Infirmary for Curing
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WEST OF ENGLAND INFIRMARY,

Under the Patronage of their Royal Highnesses,
THE PRINCE REGENT AND DUKE OF KENT.
Established in Exeter, for Curing Diseases of the Eye.

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(Lord Lieutenant of the County of Devon.)
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TO THE

PRESIDENT,

THE VICE-PRESIDENT, THE TREASURER,

The Committee,

AND OTHER GOVERNORS,

OF THE

WEST OF ENGLAND INFIRMARY,

FOR CURING

DISEASES OF THE EYE.

MY LORDS AND GENTLEMEN,

I SHOULD feel wanting in duty as well as gratitude, did I not embrace the opportunity which the present Publication affords me, of expressing my obligations for the promptitude and liberality with which you seconded my views, when I first suggested the establishment of an Infirmary in the West of England, for treating exclusively diseases of the Eye; having previously obtained for such an Institution the sanction and patronage of His Royal Highness the Prince Regent.

It cannot escape your recollection, that, in obedience to the injunctions of some of its first and warmest friends, I was constrained very reluctantly to relinquish the general practice of Surgery; but candour requires me to acknowledge, that I have since had ample reason to be satisfied with the result; for, whatever may be found in the following observations, worthy either the approbation of my Professional Brethren, or conducive to public benefit, may be in a great measure attributed to the attention which I have been able to devote to the Diseases of the Eye, in consequence of relinquishing general practice.

To you, therefore, my Lords and Gentlemen, as the first promoters of my exertions in this branch of my profession, and as the Guardians of an Institution which afforded me a very extensive practical experience, and in which the following operations originated, I gratefully dedicate this Work; with the anxious hope, that its publication will contribute to the relief of suffering humanity, and thus accord with the objects which you have so liberally endeavoured to promote.

I have the honour to be,

My Lords and Gentlemen,

Your obliged and obedient

Servant,

WILLIAM ADAMS.

28, *Albemarle-Street,*
July 25, 1812.

PREFACE.

IN the following sheets, it has been a principal object, briefly to describe my practice in the different diseases of which I have treated, and to relate the alterations and improvements in the operations which experience has suggested to me. When I have spoken of the practice of others, it has been done solely to elucidate the subject in discussion, or to point out in what respect it either coincides with, or differs from mine. I have therefore avoided swelling my Work by numerous quotations, which tend rather to show the researches of the author, than to increase the value of his practical remarks.

The Essay on Eversion of the Eye-lids, was intended for publication in the Edinburgh Medical and Surgical Journal; but having been sent too late for the last quarterly Number of 1811, I withdrew it, and have since added the chapters on Artificial Pupil and Cataract. The method proposed for the cure of Ectropium has neither been described nor practised hitherto, as far as I have been able to learn. To ascertain this, I have examined the works of the most eminent authors who have written on the subject, and have made extensive inquiries among my medical friends.

Although I am not indebted to any author, for the revival and improvement of Cheselden's operation for closed pupil, yet I think it proper to mention, that some time after I had practised the method of introducing the knife with its cutting edge backwards, to prevent the escape of the aqueous humour, I found the same mode described in Heister's Surgery.

I have, in the chapter on Cataract, described the operations applicable to all the species which are commonly met with in practice. The more speedy solution of the cataract, when divided and placed in the anterior chamber, has been noticed by different writers: but this division does not appear to have been considered by any of them as essential; neither has there been any instrument described, nor any method proposed, by which the hard cataracts of old persons can be divided, so as to be placed with safety in the anterior chamber.

The different operations which I have recommended are, I believe, very generally known, wherever I have been called on to operate. While pursuing the operation taught me by my lamented friend and preceptor Mr. Saunders, I felt myself bound by every tie of gratitude and honour to observe the secresy he had enjoined; but, having found it necessary to abandon his practice, I then no longer hesitated to invite the most respectable members of the profession to witness my operations, in order that they might form an estimate of their comparative merit with those in general use.*

It was my intention to have added to this work some practical observations on the different stages of the purulent inflammation of the conjunctiva in adults, commonly called the Egyptian Ophthalmia. I have however delayed their publication, in consequence of an opportunity recently afforded me, of establishing the general efficacy, of my practice on the worst forms of the disease. His Royal Highness the Commander in Chief having been graciously pleased to command my services, in the treatment of this disorder on some soldiers in the York Hospital at Chelsea,—in this extensive field of observation, where I have been seconded by the liberal co-operation of the Director-general Mr. Weir, the other members of the Army Medical Board, and the Medical Officers attached to the Hospital, many new facts may be developed, further opportunities of practical improvement may occur; and, as I am desirous of rendering my observations as complete as circumstances will allow, I am induced to withhold them from the Public at present, in the hope of hereafter offering them with their value enhanced by the delay.

---

* While in Dublin my operations were witnessed by the most respectable physicians and surgeons in that city; whose disinterested and friendly conduct I shall ever remember with sentiments of esteem and obligation;—and during a short stay in Edinburgh, on my return to England, the Surgeons of the Royal Infirmary, actuated by the same sentiments of liberality, requested that I would exhibit some of my operations for cataract, on patients in that Institution, which I had the honour of doing before them, and the numerous class of students belonging to the University.

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FACTS AND OBSERVATIONS

ON

SOME IMPORTANT DISEASES OF THE EYE.

CHAP. I.

ON ECTROPIUM; OR, EVERSION OF THE EYE-LIDS:

With the Description of a new Operation for the Cure of that Disease.

FEW diseases of the eye, or its appendages, exhibit a more deformed appearance, or prove more distressingly painful to the patient, than Ectropium, or eversion of one or both of the eye-lids. The frequency of its occurrence, and the repeated attacks of acute inflammation of the eye-ball, as well as of the lid, produced by the exposure of a large portion of the conjunctiva to the influence of irritating causes, have attracted the attention of many professional men of the first celebrity; and different modes of treatment have been recommended for its removal.

Among others, Professor Scarpa proposes, in recent and slight cases of eversion, to destroy the conjunctiva, at the edge of the tarsus, with caustic ; and, when the disease is more considerable, to extirpate the whole fungus close to the external muscular substance of the eye-lid, with the curved scissars ; but he adds, that, in advanced life, the eye-lids are so much relaxed, that the disease may be regarded as altogether incurable. My own experience is fully in unison with that of the learned Professor, respecting the description of cases in which caustic may be advantageously employed ; but, on the contrary, when the eversion is considerable, and consequently the tarsus much elongated, I have never found the simple excision of the fungus sufficient to effect a radical cure. It doubtless lessens the deformity ; but as a certain degree of eversion still remains after this operation, the vessels, from repeated inflammation, again become so turgid and overloaded with blood, as by their weight and distention to re-produce the disease in as great a degree as before. Mortified at having myself failed, like others, in the removal of this deformity, I endeavoured, soon after the establishment of the West-of-England Eye Infirmary at Exeter, to which I was appointed Surgeon, to devise some more effectual method of cure than any of those hitherto practised. With this view, I was led attentively to mark the appearance of the complaint in its most aggravated form, and to compare it with that of the eye-lids in a healthy state. The edges of the tarsi, if the upper and lower lids are free from disease, when the eye is closed, are very nearly parallel; but where the eversion exists in a considerable degree in the lower lid, its edge is forced down towards the cheek, and forms a line of a crescent like figure.*

In consequence of this morbid change in the parts, so much of the exquisitely sensible membrane of the eye-lid becomes everted, as to prove a continual source of pain and irritation to the patient, when exposed to heat or cold, sharp winds, dust, &c. Intolerance to a strong light, accompanied with an almost continual flux of tears, which chiefly flow over the cheek, and excoriate the integuments of the eye-lid and cheek, still further increase the sufferings of the patient. From repeated attacks of inflammation, which often give rise to opacities of the cornea, the conjunctiva at length becomes highly vascular, much thickened, and granulated in appearance: thus producing that disagreeable aspect which the complaint assumes under its worst form.

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* Vide Plate I. Fig. 1 and 3.

On first adopting the operation about to be described, I employed a very small curved bistoury, the point of which I carried along the inside of the eyelid, at its outer angle, downwards and outwards, as far as the point of reflection of the conjunctiva would admit. I then pushed it through the whole substance of the everted eye-lid and its integuments, and cut upwards through the tarsus, making an incision nearly half an inch in length. With a curved pair of scissars I next snipped off a piece of the edge of the tarsus, about the third of an inch in width, and afterwards I removed, with the same instrument, the whole of the diseased conjunctiva, to prevent it from mechanically irritating the eye-ball. After the profuse hæmorrhage had ceased, I passed a needle and ligature through the whole substance of the two divided portions, and brought the raw surfaces as accurately into contact as possible. Finding, however, that too much integument had been left at the lower part of the incision, which formed a small knob after the wound had cicatrised,* I substituted, in subsequent operations, in preference to the scalpel, a pair of straight scissars, with which I cut out an angular piece of the lid, resembling the letter V. This prevented the formation of the little protuberance, but the incision did not heal at its upper part by the first intention. It was, however, essential that this process should, if possible, be accomplished, since, independent of the delay that was thus produced in effecting the cure, the space between the two disunited edges of the lid became filled up by granulations, which in some measure conduced to the reproduction of the disease. As the frequent motion of the eye-lids, however, seemed to oppose the greatest obstacle to the adhesive process, by preventing the divided surfaces being accurately retained in contact, I left about a quarter of an inch of the lid adjoining its external angle; and, after shortening it as much as was necessary, brought the two edges into juxta-position, in which situation it was retained by means of a suture, which completely answered my expectations.† I have not specified the length of that portion of the lid necessary to be removed, since this depends on the degree of elongation and consequent eversion, and must therefore in a great measure be left to the judgment of the operator. It may not, however, be here improper to caution the surgeon against too much shortening of the parts, as, in this case, they could not be brought into contact without stretching them to such a degree as to produce ulceration, thereby detaching the ligature before an union is effected. On the other hand, if too small a portion of the diseased parts be removed, so that the least eversion in the centre of the lid be suffered to remain, chronic inflammation will be likely to ensue, and the vessels becoming turgid will, by their weight and distention, again produce a morbid elongation of the tarsus, that must finally terminate in a recurrence of the disease. By an attention to these circumstances, none of the patients on whom I have operated, for this malady, have ever been subjected to a relapse. It has often surprised me, that this simple operation, which has proved uniformly successful with me, should not have occurred to Professor Scarpa, or, so far as I have been able to discover, to any other of those ingenious practitioners who have professedly written on the subject *.

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* Vide Case II.

† Vide Case IV.

Purulent ophthalmia, whether occurring in children or adults, is often productive of eversion of the eye-lids. This variety of the disease, however, I dare venture to assert, may always be relieved by freely unloading the vessels by scarifications on the inner edge of the eye-lid, after the acute symptoms of inflammation have subsided. But should this highly important practice be too long deferred, the parts concerned in the production of the disease lose their tone, and become gradually more everted in proportion to the length of time it exists, and the

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* Mr. Ware in the first volume of his Works on Diseases of the Eye, page 42, says, "This operation of removing a portion of the tunica conjunctiva from the inside of the everted eye-lid, is not only useful when the eversion is accompanied with an acute ophthalmy, but is also sometimes the only effectual remedy in those cases, which we vulgarly denominate "bleared eyes," where the eversion of the lid is unconnected with any considerable inflammation, and, from its long continuance, may be considered as a chronic disease. The only caution necessary to be attended to, by those who perform the operation, is to avoid wounding the cartilaginous edge of the lid, lest it leave after the cure, a notch or depression in this part."

frequency of the attacks of inflammation, till the conjunctiva is completely exposed. Hitherto my experience of its efficacy has however been confined to those cases of eversion arising from neglected lippitudo, or acute attacks of inflammation of the conjunctiva, which had been either wholly unattended to, or improperly treated. But the disease sometimes exists in a more complicated state, when it is caused by small-pox, burns, or scalds of the face, &c. In such instances, very firm adhesions are formed between the integuments of the eye-lid and those of the cheek, during the cicatrisation of the ulcerated parts. Frequently the conjunctiva is so much stretched, from the part where it is reflected over the eye-ball to its attachment at the edge of the tarsus, that the whole of the internal surface of the lower eye-lid is exposed to view.

Professor Scarpa is of opinion, that a complete cure can never be effected in this species of the disease, as that portion of the integuments which is destroyed cannot be re-produced, and that consequently some degree of deformity must remain, after the most successful operation, by the greater or less exposure of the eye-ball, in proportion to the aggravation of the previous malady. He therefore recommends separating the whole internal membrane of the lower palpebra, by dissection, from its attachment to the edge of the tarsus, as near to its base as possible, and afterwards completely removing it. He objects to a simple division of the cicatrices, as he never, it would appear, witnessed a permanent elongation of the integuments produced by it. The contraction of the eye-lid towards the eye-ball, after the cicatrisation of the wound, I strongly suspect, will not be in general found sufficient to cure, or even materially to alleviate the disease, where the eversion and contraction of the integuments are considerable, since, besides the firm adhesions existing between the skin of the palpebra and cheek, from the lengthened state of the tarsus, some part of it must remain everted. A case of this kind, occasioned by a scald in the face, fell under my observation in the London Eye Infirmary, while I was a pupil, and acted as an assistant in that Institution. The conjunctiva was everted nearly half an inch, and gave the patient so much pain, when the eye was subjected to the influence of any irritating cause, that he had for some time kept it bound up. Mr. Saunders proposed an operation, as the only means of affording relief, to which the man gladly assented. On the adhesion between the eye-lid and the cheek being carefully separated with a scalpel, the lid was replaced by the finger in its natural situation without any difficulty; but, the moment that support was withdrawn, it again fell back to its former position. By strips of adhesive plaister, the lid was kept up for some time tolerably well; but as soon as the wound began to heal, an union again took place between the divided parts, which produced nearly as much deformity as before. Having left London shortly after, I am ignorant whether any further effort was made to relieve the patient. The failure of success in this case appeared to me, in a great measure, to arise from a want of support to the eye-lid to counteract the retractive disposition of the parts, during the cicatrisation of the separated integuments; and had Mr. Saunders been then acquainted with the plan I have ventured to recommend, and which I some time after communicated to him, I think the result would have proved very different. In this species of the disease I would recommend, that a free separation of the adherent parts should first be made in the manner practised by Mr. Saunders, and afterwards the lid should be shortened, and brought into contact, as in a case of simple eversion. By the speedy union of the divided edges, the eye-lid will be retained in its place, and the danger of the integuments adhering to the cheek, be in a great measure prevented. The extended raw surface would most probably be covered by a new production of skin; but should even some degree of shortening of the integuments occur during the process of cicatrisation, and the edge of the tarsus be again somewhat pulled downwards, it will then be reduced to that stage of the disease, where the caustic or scissars may be employed with advantage. Should any disposition to a relapse be observed during the progress of the cure, pressure may be made by means of a soft compress on the lid against the eye-ball, by means of a monoculus bandage; and the after treatment should in every respect be the same as that directed in cases of simple eversion.

Sometimes the upper eye-lid also becomes everted from the same cause, which is still more unpleasant in appearance, and more distressing to the patient Fortunately, however, this is but a rare occurrence, as in my practice, which has been very extensive, I have only witnessed a single instance of this complaint. The treatment should be similar to that above described in cases where this disease attacks the lower eye-lid.—

CASE I.

John Ford, of Witheridge in the county of Devon, aged 66, by trade a carpenter, was admitted an out-patient of the West-of-England Eye Infirmary, in the early part of November 1808, for an acute ophthalmia in his left eye, which began about ten days before he applied for relief at that Institution. On examination, I observed an opake circumscribed spot on the internal surface of the upper part of the transparent cornea; from which had exuded a considerable portion of coagulable lymph, that occupied the lower part of the anterior chamber. The patient complained of an acute pain in the eye, which extended over the whole side of the head, accompanied with great intolerance of light and redness of the adnata. He was immediately subjected to a very rigid antiphlogistic plan. Besides copious and repeated bleedings from the arm and temporal artery, leeches, blisters, antimonials, and purgatives were successively employed. But though the strength of the patient was thereby so much diminished that he could scarcely walk without support, no effect whatever was produced in checking the disease; on the contrary, the effused fluid progressively augmented in quantity, until the whole anterior part of the eye became filled with it, when ulceration through the whole substance of the cornea ensued, and the entire organ was destroyed.

The lower lid of this eye had been completely everted for some years, in consequence of repeated attacks of inflammation, arising from neglected lippitudo. The edge of the tarsus formed a line resembling the segment of a circle, the most dependent part of which was more than one third of an inch from the angle formed by the conjunctiva, where it is reflected over the eye-ball. The temporal angle of the lid was more everted than the nasal, and could not be restored to its natural position by any degree of force the patient was able to bear. The everted conjunctiva had become granulated, morbidly vascular, and sensible to the touch. Disappointed in my efforts to save the eye, I proposed an operation upon the eye-lid, to relieve him from the painful irritation caused by so much of the sensible conjunctiva being continually exposed. With this he gladly acquiesced.—I therefore, on the 20th of November 1808, in the presence of Mr. Nelson, a respectable surgeon of Durham, commenced the operation, by making an incision with a small curved bistoury downwards and outwards, through the extremity of the temporal angle of the lower eye-lid; with a curved pair of scissars I then cut off about one third of an inch of its elongated edge, and with the same instrument removed the diseased parts of the conjunctiva, which bled very profusely. The bleeding was promoted as much as possible, by the application of a soft sponge frequently dipped in warm water. As soon as the hæmorrhage ceased, I passed a crooked needle armed with a waxed thread through the tarsus, a little below its edge, then through the whole of the parts forming the lid at its outer angle; and after bringing the two raw surfaces accurately into contact, I tightened the ligature moderately, and lastly covered the whole eye with a plaister of simple ointment spread on lint. No inflammation ensued, and on the fifth day after the operation, having observed, that the parts had completely united, I removed the ligature, and had the gratification of finding the lid perfectly restored to its natural situation. A little redness remained along its edge, but disappeared as soon as the conjunctiva healed. This took place at the end of a fortnight, when the patient was discharged, cured. He called on me twelve months after this, and I found every vestige of the disease entirely removed.

CASE II.

Mr. Menoe, ætat. 60, clerk in a Banking-House, No. 5. Granby Row, Dublin, consulted me about the middle of August, 1811, for a very bad case of eversion of the lower lid of his left eye, which, according to his account, was produced eleven years before in consequence of repeated attacks of inflammation. The pain and irritation of the eye and lid were very great, especially if exposed to cold winds, &c.: when the secretion of tears became sometimes so abundant, that vision was not unfrequently for a while obscured by their copious effusion. The conjunctiva, as in Ford's case, was granulated, highly vascular, and sensible to the touch; but it was much more everted, and had a more disgusting appearance. The steps of the operation, and the after treatment pursued to effect a cure in this instance, were so precisely similar to that already described, that I deem it superfluous to repeat them.—On the fifth day, the ligature having become loose was removed, and I found an union every where effected, except at the edge of the tarsus. Some strips of adhesive plaister were passed along the face close under the lid from the nose to the ear, and by this means the small space which had not united by the first intention, became filled up with granulations, and the wound healed in about a fortnight. Owing to a great relaxation of the integuments of the eye-lid, a small prominence remained,* half the size of a pepper-corn; independent of which, this eye-lid looked as well as the other. Mr. M. was only prevented a week from attending his office.

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* Vide Plate I, Figure 4.

CASE III.

David Crommie, of Lisnamulligi, county of Down, in Ireland, applied to me in Dublin, for an eversion of the lower eye-lid, about the middle of September, 1811. He stated that, twelve months before, he had been attacked with an inflammation, and thickening of the upper lid of his left eye, which prevented him from raising it, so as to uncover the transparent cornea. This, after a short time, subsided; but soon afterwards the lower eye-lid was affected with redness along its edge, which by degrees became everted in the manner I saw it. He complained of suffering very acute pain, especially when the part was exposed to the influence of cold winds. The conjunctiva exhibited the same appearances as in the last-mentioned case. September 16th, I operated on him, in the presence of Mr. Smith, a respectable practitioner of that city, who was also present at the operation performed on Mr. Menoe. I proceeded nearly in the same manner before described; but, to avoid leaving too much integument, which might form an eminence similar to that noticed in the recital of Mr. M.'s case, I cut out an angular piece of the tarsus and lid, of the shape of the letter V, and, after removing all the diseased conjunctiva, finished the operation as in the preceding cases. I next applied some strips of adhesive plaister across the face, to obviate the retractive disposition of the lid, and to prevent the ligature from ulcerating too soon. This excited some irritation and tumefaction in the integuments below the eye the next day, which were removed by the exhibition of two brisk cathartics at the interval of a day or two, and the application of folds of linen frequently moistened in a cold saturnine lotion. On the fifth day I removed the ligature, but, as in the last case, a small portion of the wound, at its upper part, had not then united. By supporting the lid, however, with adhesive plaister, this soon healed, leaving only a simple cicatrix *.

CASE IV.

William Lee, East-street, Manchester-square, was attacked with acute inflammation in both eyes in the beginning of April, 1811, and on the day following he became an out-patient to an Eye Infirmary. On the fourth day after his admission the

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* Vide Plate I. Figures 1 and 3.

left eye suppurated, the cornea burst, and the organ was lost. The anterior chamber of the right eye also became filled with lymph or purulent matter, to discharge which an opening was made in the upper part of the cornea. Through this opening so much of the iris protruded, that the remaining aperture of the pupil does not exceed the size of a pin's head; but, happily for the patient, this operation saved the globe of the eye from total destruction. The violence of the inflammation, however, produced an eversion of both the lower eye-lids. The right eye was considerably more deformed than the other, and consequently more painful, when exposed to the action of any irritating cause, such as cold winds, dust, &c. Nearly as much of the conjunctiva was everted, as in Ford's case, and equally granulated in appearance. February 12th, I operated on the right eye by making an incision somwehat less than the third part of an inch from the external canthus, and cutting out an angular portion of the lid of rather more than the third of an inch in width; after which I removed all the diseased parts of the conjunctiva. I then brought the raw edges accurately into contact by means of a suture. Not the slightest inflammation ensued. On the fifth day after the operation I removed the ligature, and found the wound perfectly united, except a small opening at the lower part, through which the tears escaped, and trickled down the cheek. I destroyed the edges of this, which appeared as if disposed to become fistulous, with the argentum nitratum, and thereby so much accelerated the healing process, that within a fortnight from the period of the operation the disease in the eye-lid was perfectly cured. The patient, though able to find his way without a guide, is nevertheless incapable of executing any kind of handicraft labour; on which account I have consented, at his earnest request, to perform the operation for closed pupil on his right eye at no very distant period. I did not, however, deem any operation advisable for the eversion of the left eye-lid, as it was unaccompanied with much pain, and as the eye itself was irrecoverably lost. In order to prevent the small opening at the bottom of the wound, which was in this case occasioned by my having placed the ligature too near the edge of the tarsus, the needle should be passed through the middle of the incised parts, which, by keeping them in close contact, will very probably in future effectually prevent the recurrence of a similar accident.

CHAP. II.

SECTION I.

ON CONTRACTED OR OBLITERATED PUPIL.

A CONCISE HISTORY OF CHESELDEN'S OPERATION FOR ARTIFICIAL PUPIL, AND THE OPINIONS ENTERTAINED OF IT BY VARIOUS EMINENT AUTHORS.

NO department of surgery can be deemed of greater importance than that which has for its object the restoration of sight to the blind. Hence those diseases which affect the organs of vision, and the adjacent parts, have in every age deservedly attracted a large share of the attention of surgical practitioners. Nevertheless, strange as it may appear, no operation for the relief of those persons labouring under a closure of the pupil, seems to have been attempted before the time of Cheselden. This celebrated surgeon has described his mode of operating nearly as follows, and illustrated it by plates, in the thirty-fifth volume of the Philosophical Transactions, page 451, published in the year 1735. The eye-lids being held open by a speculum, he then took a narrow and single-edged knife, and passing it through the sclerotica as in couching, he afterwards thrust it forwards through the iris, and in extracting it cut through the iris in the manner represented in the plate. If the disorder was not accompanied with a cataract, he considered it best to perforate the iris in the middle, otherwise when there was a cataract he made the incision a little higher in the iris, that the cataract might not obstruct the ingress of the rays of light *. The cataracts which accompany this disease, he supposed, were generally very small, and sometimes their adhesion to the iris so firm as to render it impracticable to couch or depress them. This operation, however, did not prove equally successful in the hands of his immediate successors, either in Britain, or on the Continent.

Mr. Sharp, speaking on the subject of artificial pupil, as practised by Cheselden, observes, "I would not mislead any one who shall practise an operation not yet much known in the world. I do confess that the danger of the iris separating from the ligamentum ciliare, or of the wound

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* In this description of the operation given by Cheselden, it is only in the upper part of the iris that he recommends the opening to be made, when the disease of closed pupil is complicated with cataract; but in the plates annexed, the incision is represented in one case above, and in the other below the centre of the iris.

not enlarging sufficiently, do upon the whole make the event very doubtful. I once performed it with tolerable success, and a few months after the orifice I had made contracted, and brought on blindness again."

Warner remarks, that, "however ingenious that operation of dividing the iris may be thought (in case of an absolute contraction of the pupil, or of a perfect adhesion of the cataract to the iris), which was invented and recommended by that great operator Mr. Cheselden; I must confess, I never yet saw a single instance of success from it, and therefore cannot recommend it as an advisable operation under any circumstances whatsoever."

Scarpa, who, it must be recollected, appears to have had no personal experience of this operation, expresses his doubts of its ultimate success, on the authority of Janin, who relates two cases in which, "though he performed it with the greatest care, no advantage accrued to the patient, since, after the symptoms produced by the operation had subsided, he found, that in both patients the transverse opening made in the iris, with the cutting edge of the needle, had re-united and healed."* To the same purpose the younger De Wenzel observes, that, " though the simple incision did succeed in the case of the blind person mentioned by Cheselden, subsequent and repeated operations have proved that the fibres of the iris will close again, after they have been thus divided. My father, he continues, has had many instances to convince him of this fact; and it is in consequence of these, that in our practice we employ a different mode of operating."

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* Maladies de l'Œil.

In the Second Edition of Mr. Ware's Chirurgical Observations relative to the Eye, &c. published in 1805, p. 253, he gives his opinion on this subject, in the following note. " The Translator sees no good reason to dispute the veracity of Mr. Cheselden in his description of the present case. It was certainly possible for him to succeed in the way he has here mentioned. At the same time, the translator is of opinion, that the operation proposed by the Baron, which he thinks would naturally occur to every person who prefers the operation of extraction to that of depression, is much more likely to be attended with success."—The description of Cheselden's operation as quoted by De Wenzel in this work, and to which Mr. Ware's note refers, appears to me obviously inaccurate, and to be a translation from "L'Eloge de Cheselden dans l'Histoire de l'Académie de Chirurgie, Paris 1778," tom. II. p. 115. This fact is, however, obvious—at that time Mr. Ware did not practise Cheselden's operation.

Such having been the general opinion, it cannot appear surprising that it should first have been disregarded, and at length wholly abandoned. Accident in a great measure first suggested to me the idea of reviving it. William Pike, of Widworthy, near Honiton, Devon, was admitted a patient of the West-of-England Infirmary for curing diseases of the eye, early in November 1808. He was affected with capsular cataracts, which had ensued after the unsuccessful performance of the operation of extraction in a general hospital. The pupil of each eye was nearly obliterated, and the rays of light were prevented from passing through the small apertures which still remained, by portions of capsule thickened and firmly adhering to the posterior part of the iris. I at first attempted with the flat part of my needle to separate the adhesions; but finding this impracticable, I turned the instrument edge-ways, and with the point cut through the capsules, thereby making an aperture in each, sufficiently large to enable the man to see the minutest objects with the assistance of proper glasses. The fortunate result of this operation encouraged me to hope, that with one of my cataract needles made very sharp, I might be able to divide the fibres of the iris, in a similar manner, in a case where the pupil was closed. An old man of the name of Heard, from the parish of Bow, Devon, who had also undergone the operation of extraction for cataract in the same general institution as Pike, afforded me an opportunity of carrying this design into execution. So much of the iris had protruded through the opening made in the cornea in consequence of this operation, that the superior margin of the pupil adhered to the cicatrix of the cornea, by which the iris was considerably stretched ; and the patient (who could scarcely distinguish light) had suffered so severely from pain and inflammation, that I expressed my fears to him, that the retina was much diseased, if not entirely insensible. He was, however, exceedingly anxious to undergo any operation which might afford the least chance of obtaining relief ; and as I was desirous of making a trial of the plan just mentioned, I acquiesced in his request, though under such inauspicious circumstances. Accordingly, in the beginning of December 1809, assisted by my nephew, Mr. Hockin, I made a division of the iris, exactly in its centre—the radiated fibres immediately retracted, and formed an opening of a large size, nearly circular, and quite clear. From the great sensibility which the iris is generally supposed to possess, I was much surprised to find, on inquiry of the patient, that the operation gave him little or no pain; but I have since almost uniformly observed this to be the case. As no inflammation succeeded, I examined the eye on the following day, when my apprehension appeared to have been too well founded, for the man could not perceive light better than before.—The result of this operation, although of no advantage to the patient, yet evinced to me the practicability of making a permanent aperture in the iris.

I therefore entertained a sanguine hope that if this operation were performed on an eye in which the retina was in a sound state, it would prove perfectly successful. In the spring of 1809, I operated on Richard Bligh, the pupil of whose left eye was not larger than the head of the smallest pin; in whom my expectations were realized to their fullest extent, for, as will be seen in Case 11, he was allowed to return home at the end of six weeks, perfectly cured, and has since resumed his trade as a shoe-maker. Immediately on his discharge I communicated to my friend Mr. Saunders the manner in which I had performed the operation, and the progress of this patient's convalescence. To this letter he favoured me with the following reply.

Ely Place, June 19th, 1809.

My dear Friend,

I am happy in the success of your operation in the case of cataract with adherent iris. As far as that case goes, nothing can be said against it—but not knowing in what degree the adhesions existed, or how far the capsule had been thickened, I cannot judge of the universality of its success. I am sorry to check any expectations of yours, *but certainly in a great number of cases it cannot succeed.* I succeeded happily myself in an anomalous case of a child born blind with pupils fixed, and certainly neither bigger than a good pin's head, by passing the instrument between the irises and capsules and disengaging them. The case has succeeded, as well as any other of my cases, in regard to vision; both pupils are circular, larger than before the operation, but fixed—yet I do not think that, generally speaking, one can disengage such adhesions. I tried your plan yesterday, but expect no success, for the vitreous humour was in so diseased a state that the eye was drained and became flaccid on the escape of a fluid by the side of the instrument during the operation. I am inclined to think that a certain condition of the parts is requisite to bring success in your operation—viz. that the capsule must not be inordinately thickened, or too much combined with the iris. I think, in the operation above spoken of, I should have succeeded by the division of the iris, as you did in your case. However, I shall give it a fair trial in such probable cases as may come in my way.

Your sincere friend,
J. C. SAUNDERS.

The success which had attended these my first attempts to revive an operation that had so long been deemed either impracticable or useless by the highest professional authorities, both at home and abroad, acted as an additional stimulus to my exertions, while the situation I filled in the Exeter Infirmary for diseases of the eye afforded me the most ample means of extending this practice.—Notwithstanding the sanguine hopes I entertained, more than twelve months elapsed before I again succeeded in a case of this kind, though, during that period, I had frequent opportunities of operating in cases of closed pupil complicated with cataract. By attentively reflecting on these failures I became acquainted with several causes which concurred to prevent success. One of the principal was the want of an instrument well adapted to this purpose. With the cataract needle I could not cut through the iris by a gentle force; and if I ventured to apply a greater force, the iris separated from its attachment to the ciliary ligament, which rendered all further attempts to effect a central aperture useless. The same accident appears to have happened to Mr. Sharp in his trials of this operation. In the hopes of procuring an appropriate instrument, I twice went to London, at the interval of a few months; but, though I described to different instrument-makers the purposes for which it was intended, still I could only procure the needle which cuts on one edge, and the spear-pointed knife, of different sizes, described by Cheselden. At length it occurred to me, that the curved edge of the common dissecting scalpel was well adapted to cut with facility. I therefore, when in London a third time, got a small knife made, two-thirds of an inch in length, and nearly a line in width, with a straight back, sharp point, and a curved edge, which cuts back towards the handle for about three lines. * This instrument passes through the coats of the eye and iris with great ease, and when constructed conformably to this description will, I am confident, answer every purpose for which it is intended.

In March 1810, during one of my visits to London, I met Mr. Ware in consultation in the case of Lady W*****, (the initial of whose name I am here permitted to insert), who labours under closed pupil, complicated with cataract and amaurosis. I then related to Mr. Ware the result of my first operations, and explained to him the manner in which they had been performed. I also mentioned the circumstances which I conceived had induced the generality of surgeons to relinquish the operation of Cheselden, and pointed out the manner in which these might be obviated. In the course of the same conversation, I expressed a confident expectation, that if I could obtain the instrument I wished, the disease of closed pupil would no longer continue so intractable as it had hitherto proved.

Vide Plate III. Fig. 1. 2.

Mr. Ware appeared so incredulous on the subject, that he seemed almost to doubt the facts I had stated, and by no means acquiesced with me in the general inferences I had deduced from them. In the following June, at his own house, I again renewed the subject of artificial pupil, but found his opinion unchanged. At this time I put into his hand a copy of the first annual report of the West-of-England Infirmary for curing diseases of the eye, published November 1st 1809, more than twelve months before the appearance of Mr. Gibson's work on artificial pupil, in which is recorded a vote of thanks given to me by the respectable Committee of that Institution, "for having practised an operation with perfect success in the case of closed pupil complicated with cataract, very few cases of which, as this meeting is informed, are recorded in the annals of British surgery."

Though much deference is unquestionably due to the opinions of Mr. Ware on subjects connected with diseases of the eye, yet in the present instance I confess they left no impression on my mind unfavourable to the operation in question. It is with the greatest satisfaction I am able to add, that further experience has fully justified the hopes I then entertained, as I have, since the period of which I am speaking, performed that operation, in a very considerable number of cases of obliterated pupil, with the most perfect success. Whether from the successful cases recorded in the second report of the West-of-England Eye Infirmary, which by order of the Committee was published in the newspapers, or from whatever other cause I know not, but I have great satisfaction in observing that a complete revolution has, since the period above alluded to, taken place in the opinions of Mr. Ware on this subject, if I may be allowed to judge from the alteration made in the note on artificial pupil, quoted in the foregoing part of this chapter, p. 24, and which is inserted in the third edition of the same work, published in November 1811, in the following words :—" The translator sees no good reason to dispute the veracity of Mr. Cheselden, in his description of the present case. It was certainly possible for him to succeed in the way he has here mentioned; and the translator particularly recommends the operation in those cases where the pupil has become closed after the extraction of the cataract. In these, the opaque crystalline having been removed, it is most probable that the imperforate iris forms the only impediment to the passage of light to the retina; and the iris being stretched by the closure of the pupil, its division, in the way recommended by Cheselden, gives its fibres an opportunity to retract, which they generally do to a considerable extent. The translator has repeatedly performed the operation with perfect success: scarcely any inflammation having been excited by it, and vision becoming as perfect as after the most successful removal of the cataract."*

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* In a small pamphlet also, published in November 1811, Mr. Ware speaks still more decidedly in favour of Cheselden's practice. "Baron De Wenzel (he observes) objects to the operation proposed by Cheselden, as ill adapted to accomplish the object intended by it. I beg leave to observe, however, that when the pupil has become closed after an unsuccessful operation of extracting the cataract, I have in several instances made a new pupil, agreeable to Cheselden's mode of performing the operation, with the most perfect and striking success. The fibres of the iris retracted as soon as they were divided, and left the pupil very nearly of its natural size. Its shape was not quite round; but the sight was immediately restored, and to so great a degree, as to enable the patient, by the help of suitable convex glasses, to see distinctly both near and distant objects, neither pain or inflammation being consequent on the operation."

Having now faithfully detailed the circumstances which led me to the adoption of Cheselden's obsolete operation, I trust (although unexpectedly anticipated in its communication to the Public) I have satisfactorily shewn that I have not been indebted to the works of any other author for its revival and improvement. By the various alterations which I have made in this operation, I have been enabled to render the practice of it applicable to every morbid state of the eye requiring an artificial pupil. I shall next proceed to give a description of the operations requisite in these various states, and afterwards subjoin some general remarks on the subject, together with some cases illustrative of their efficacy.

SECTION II.

A DESCRIPTION OF VARIOUS OPERATIONS APPLICABLE TO THE MORBID STATES OF THE EYE REQUIRING AN ARTIFICIAL PUPIL.

Simple Contraction or Obliteration of the Pupil.

A PARTIAL or total obliteration of the pupil frequently succeeds the removal of the crystalline lens. When the closure arises from a considerable protrusion of the iris through the section in the cornea, in consequence of an escape of the vitreous humour during the operation of extraction, or that it proceeds from supervening inflammation after accidental wounds of the eye, or after the texture of the lens has been freely broken up by the operation of couching, it is termed a simple obliteration of the pupil. In all cases where the lens has been thus removed, and the cornea is free of opacity, the division of the iris should be made in the centre, and should extend across two-thirds at least of its transverse diameter. The patient being seated as in the operation for cataract, and the eye rendered steady by a gentle pressure with the concave speculum,* placed under the upper eye-lid, the artificial pupil knife should be introduced through the coats of the eye about a line behind the iris, with its cutting edge turned backwards instead of downwards. The point is next brought forward through the iris somewhat more than a line from its temporal ciliary attachment, and cautiously carried through the anterior chamber until it has nearly reached the inner edge of that membrane, when it should be almost withdrawn out of the eye, making a gentle pressure with the curved part of the cutting edge of the instrument against the iris in the line of its transverse diameter. If in the first attempt the division of the fibres of the iris is not sufficiently extensive, the point of the knife is to be again carried forward, and similarly withdrawn until the incision is of a proper length, when the radiated fibres will immediately contract, and an opening of a large size will be formed. After the operation is thus completed, the eye should be covered over with a plaister of simple ointment, spread on lint, and the patient put to bed with his head raised high.* The after treatment is the same as that fully described in the Chapter on Cataract, to which I refer my readers.

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* Vide Plate III. Fig. 6 and 7.

Obliterated Pupil complicated with Cataract.

From wounds of the eye-ball, but more frequently from inflammation of the iris, an obliterated or a very contracted pupil exists complicated with an opacity of either the lens or its capsule, and often of both. The primary steps of the operation are the same in these as in the simple cases. I take care, however, very freely at the same time to cut the cataract in pieces. Some of these I bring forward into the anterior chamber, and leave the remaining portions in the opening of the iris newly formed by the operation. These act as a plug in preventing its re-union by the first intention, and contribute to assist the radiated fibres in keeping the pupil more extensively open. In the course of some weeks, when the opaque lens is absorbed, all disposition to re-union in the divided iris is entirely done away.† When the disease has existed for a number of years, I have generally found the capsule so very dense, and considerably thickened, that the vitreous humour has not afforded sufficient resistance to enable me to open or divide it. In such cases I formerly depressed both capsule and lens without division; but as they always returned to their former situation, unless when the vitreous humour was disorganized,* I now make it an invariable rule, in order to prevent this unfavourable consequence, to cut them in pieces by a subsequent operation, by which means they become dissolved and absorbed. In some instances, arising either from accident, or some unknown spontaneous cause, the lens has been absorbed, leaving nothing but the opaque capsule, which in every case of obliterated pupil from inflammation of the iris, is firmly adherent to the posterior part of this membrane. The capsule, as well as the iris, should be here first completely divided, and the former membrane being liberated from its adhesions, with the point of the instrument, should if possible be cut in pieces, and pushed into the anterior chamber, where it will become absorbed.† If, however, it is so much thickened that it cannot easily be divided, it may be forced out of the axis of vision without any fear of its return.*

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* Vide Cases 5—10. † Vide Cases 11, 12.

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* Vide Case 15.

† Vide Case 14.

Obliterated Pupil with Opacity of the transparent Cornea.

The transparent cornea, from different species of inflammation, and from various other causes, is frequently subjected to ulceration, which penetrates either wholly, or in part, through the substance of that coat. On the healing of the ulcer, an indelible cicatrix remains, which renders opaque that part of the cornea which has suffered from ulceration, and prevents the transmission of light through the diseased surface. In some cases the iris has protruded to such an extent, through an opening made in the cornea by the ulcerating process, as to occasion a partial or total obliteration of the natural pupil ; in others, the ulceration has extended so far on the external surface of the cornea, as to produce an opacity which totally obscures the pupil.

Both these events often occur ; and, in the former case, an artificial opening in the iris should be made opposite to the remaining transparent part of the cornea, wherever that may be found: but for the purposes of vision, the preferable parts are the external or lower margin of the iris, as well in these as in every other case where the centre of the cornea is opaque, and they are also the best adapted for the easy performance of the operation. If the opacity does not obscure more than one-third of the diameter of the cornea, I practise the operation as described for closed pupil complicated with cataract, and make the newly-formed opening extend from the opacity as nearly to the edge of the sclerotic coat as possible. The crystalline lens, whether transparent or opaque, is then cut up, and a part placed in the opening of the iris, to act as a plug.* This is my method of practice where the opacity is not very extensive; but when there is not above a line of the circumference of the cornea remaining clear, I then introduce the knife, though in a similar manner, at the external and upper part of the eye, in order to prevent the escape of the aqueous humour before the operation is completed, and make a perpendicular incision through the outer margin of the iris opposite to and extending the whole length of the remaining clear part of the cornea.* This operation much resembles that recommended by Professor Scarpa for artificial pupil, with this difference, that the instrument is introduced through the coats of the eye in a different part, and the fibres of the iris are divided, instead of being detached from its ciliary ligament. But if, as has happened in some of those cases, the iris separates from its ciliary attachment, my operation becomes similar to that of Scarpa. Sometimes there is only a small protrusion of the iris, which adheres afterwards to the cornea, causes the edge of the pupil to be of an irregular form, and prevents its expansion beyond the limits of the cicatrix, by which vision is either partially or wholly obscured. In this case, if the disease is uncombined with any other morbid affection of the pupil, and the cicatrix is not of a large size, the operation should consist in introducing the artificial pupil knife through the cornea, a little anterior to the iris, and carrying its point on to the adherent part, which should then be divided with the cutting edge of the instrument. This accomplished, the iris immediately recedes to its proper situation, and the pupil will again recover its natural size and powers. But if in addition to the adhesion the pupil be considerably contracted, or entirely obliterated, the operation, as for central pupil, must be performed opposite to a clear part of the cornea, and the point of the knife brought forward through the newly-formed aperture into the anterior chamber, and all adhesion between the cornea and iris separated. * Where the cicatrix is small, and there is no adhesion of the iris to the cornea, great benefit may be derived from applying a drop of a solution of belladonna within the eye-lids every morning. The rays of light which (by the great dilatation of the pupil) are thus enabled to pass to the retina round the circumference of the opacity, are sufficient to afford very useful vision, by which I have seen a person read with facility the smallest print while the iris was under the specific influence of this application, who at other times could not see to avoid the largest objects. A question naturally arises here. Will not the belladonna so applied either produce dangerous consequences, or entirely lose its effect by frequent repetition and long use? From the extensive expe-

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* Vide Case 7.

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* Vide Case 16.

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* Vide Case 17.

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* Vide Case 8.

rience I have had of its powers during the last ten years, I am strongly impressed with the belief that no ill consequence is to be dreaded, as I have every reason to feel convinced, that, instead of sympathetically producing an enlargement of the pupil, by first acting on the retina, as some have supposed, its operation is limited to the radiated fibres of the iris, to which it affords, for a certain time only after each application, its specific effect.* Like all other stimulants, it will lose its power by continued repetition; but it is remarkable, that after its application has been suspended for a while, it regains its accustomed influence. The man who forms the subject of Case 16, had used it for more than two years; but finding it no longer produce any effect, he laid it aside for a short time, and resumed it soon after my arrival in Dublin, when it acted as powerfully as before. But to proceed with my subject. It often happens that the cicatrix in the cornea is so large as to reach beyond the utmost extent of dilatation of the pupil, even when under the influence of belladonna: yet, if the whole surface of the cornea is not obscured, an attempt may then be made either to open a new aperture in the iris opposite to the remaining unobscured part, according to the plan proposed by the late Mr. Gibson, of Manchester,* or to drag the natural pupil on one side. In cases of this kind, I however very much prefer the latter plan, because in the operation recommended by Mr. Gibson, the incision made in the cornea must be of such extent as probably to produce a considerable opacity in the portion of it which still remained transparent; and this objection, which is candidly acknowledged by Mr. Gibson, page 99 of his valuable Observations upon Artificial Pupil, I saw very strongly exemplified in the case of Mr. Rushton, of Liverpool, who had been operated on by that distinguished surgeon. The artificial pupil, which was of a small size, was seated quite at the bottom of the external margin of the iris; others, which the patient informed me had been made above it having been successively obscured by as dense an opacity as that which originally affected the centre of the cornea; and this opacity encroached even upon that part opposite to the upper portion of the pupil still remaining. In this operation* of

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* This was the opinion of the late Mr. Saunders, as will be seen in his paper on Inflammation of the Iris, first published in the London Medical and Surgical Journal for July 1806; also that of our mutual professional preceptor, the late Mr. Hill, of Barnstaple, in whose practice, I believe, Mr. Saunders first saw the belladonna used.

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* Mr. Gibson, with a broad cornea-knife, makes an opening in the cornea, a line anterior to its junction with the sclerotica, about three lines in extent. Through this opening the aqueous humour escapes, and is generally followed by a part of the iris. If this membrane does not protrude sufficiently of its own accord, he makes some degree of pressure on the eye-ball; and when it forms a little bag of the size of a large pin's head, he cuts it off with a pair of fine curved scissars. The iris then recedes within the eye, and the portion which has been removed will leave an artificial pupil more or less circular.

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* In all the other operations recommended by Mr. Gibson in cases of obliterated pupil, the cornea is equally liable to opacity as in this; while from the necessity there is of introducing the point of the two-edged scalpel, or the iris scissars, and sometimes both, through the iris, for the purpose of removing a part of it, the capsule and lens must as certainly be rendered opake, if not previously so, as in any of my operations already described for artificial pupil, where the cornea is not only untouched, but the lens in most instances made useful in preventing a re-union of the divided iris.

Mr. Gibson's, it is true there is little risk of injury to the crystalline lens or its capsule; but the preservation of the lens can be of no advantage, if the inflammation occasioned by the incision made in the cornea be such as to render the whole portion of that coat opposite to the artificial pupil opaque.—Upon the authority of Mr. Gibson's publication, I made trial of his operation in two or three instances; but the unfavourable result induced me wholly to abandon it, and to substitute for it the following operation. To this I was led by Miss Russell's case,* by which it appeared to me that the original pupil might be so much dragged to one side (without any risk either to the transparent lens or its capsule,) as to be made subservient to vision by a very simple operation, namely, that of making an opening in the cornea of so small a size as neither to risk opacity, or to require the removal of any part of the iris. The unavoidable diminution which (after Mr. Gibson's operation) must occur in the size of the newly-formed pupil, when the natural one is much dilated, can never take place by pursuing this plan first recommended.* I first fix the eye with a speculum, and then enter my closed pupil-knife through the cornea about a line anterior to the iris, and make the opening somewhat longer than the width of the instrument. Through this the aqueous humour will make its escape, and be followed by a part of the iris. If the iris does not protrude sufficiently from the pressure of the speculum, to extend the edge of the natural pupil as far as the puncture in the cornea, I lay hold of it with a pair of small forceps, and gently pull it out, using great caution not to employ so much force as to rupture it. Having in this manner dragged the outer edge of the pupil a little through the puncture, I do not cut off the protruded part, but suffer it to remain strangulated, which prevents it from again returning within the cavity of the eye. The puncture heals, and it includes the protruded part of the iris, which is shortly removed by a very weak solution of argentum nitratum, dropped into the eye two or three times a day. Care should be taken to make the incision no larger than just sufficient for the iris to protrude, in order to avoid the opacity which would be likely to ensue were it of a larger size, and also to prevent the iris receding when the cornea is again distended by the regeneration of the aqueous humour. In one instance even, where there existed a slight adhesion of the iris to the cornea, I was enabled successfully to accomplish this operation, after having first liberated the iris from its attachment.* If the pupils in both eyes be obliterated, and the corneæ opake, the openings should be made in the internal margin of the cornea of one eye, and the external margin of the other, because the motion of the two eyes being synchronous, the patient will thus see with both at once when viewing a lateral object; whereas, if each external part were the subject of operation, he would see but with one eye at a time.

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* Vide Case 21.

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* I have not deemed it necessary to describe the various operations for artificial pupil proposed by different authors, with the exception of Professor Scarpa's; conceiving them more objectionable than those recommended by Mr. Gibson, as they all require a still larger opening to be made in the cornea, consequently the risk of inflammation and opacity is much greater.

In the description of the different operations for artificial pupil, I have confined myself to the recital of facts, ascertained by my own experience. It will be obvious that I have assumed the existence of circular and radiated fibres in the iris. This opinion, though supported by many eminent anatomists, is not yet generally considered as established.

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* Vide Case 18.

But it is foreign to the plan of the present Work to discuss any theories upon the subject; for, whatever may be the result of anatomical observations upon this question, the practicability and success of the operations, as illustrated by the cases referred to, will stand upon the evidence of facts against all hypothetical arguments.

SECTION III.

General Observations.

It should be recollected that Cheselden, in cases of obliterated pupil complicated with cataract, recommended an opening to be made in the iris above the edge of the cataract. He entertained an opinion that the cataract in such cases was generally of a small size, and that it did not always admit of a separation from the posterior part of the iris. Under this impression, and not fully acquainted with the solvent powers of the aqueous humour, his practice was as judicious as any that could have been suggested.—Subsequent inquiry has, however, shewn, that Cheselden was incorrect in his hypothesis as to the size of the cataract complicated with obliterated pupil, a person having a large lens being equally subject to a closure of the pupil as when the lens is small; and it is plain that he was not aware that the aqueous humour was endowed with so great a solvent power as it is now known to possess. In cases where the cornea is unobscured, a slight consideration of the structure and form of that coat will shew the superior advantage of effecting a central opening in the iris. The cornea, from its convex form and transparency, is admirably adapted to the purpose of collecting and transmitting the rays of light, which, passing through the aqueous humour, are still further concentrated towards the natural situation of the pupil. Should therefore the artificial pupil be made in any part near the circumference of the iris, instead of its centre, vision must be comparatively imperfect, in proportion to its distance from that point.—This observation may be said to militate against making a lateral pupil; but surely, if by a mild operation a patient previously blind can obtain some useful vision, it is advisable for him to submit to it, though the nature of the case will not admit his seeing so perfectly as where the operation for a central pupil can be advantageously performed. Instead of depressing the crystalline lens, when I find it sufficiently soft to be cut in pieces, I make it useful by placing some portions within the edges of the wound, where, by keeping separate the cut edges of the iris, it effectually prevents their reunion. In two or three instances of closed pupil, in which I have operated, where the cataract was too hard to admit of this, I found the iris diseased, and considerably thinner in its centre than at the circumference, sometimes enabling me to see the opake lens through the greater part of its extent. In these cases, from the extensive central division of the iris, some of its diseased part having separated with the adherent capsule, and afterwards becoming absorbed, nothing but the rim of the iris has remained, leaving a pupil of a much larger size than when the lens admitted of division in the first instance.* It is obvious that a re-union of the iris cannot again take place where this occurs.—From the liability to re-closure in the newly-formed pupil, when the operation has been performed agreeably to the rules laid down by Cheselden, and which is evident from the quotations I have made from the works of so many eminent operators, it is probable there are some persons, notwithstanding all the caution with which my operations have been conducted and the success which has attended them, who may apprehend that at some subsequent period the artificial pupil, even thus made, may again become closed. Three years have elapsed since I operated on Bligh, and there has been no disposition to a re-union of the fibres of the iris in his case, or have I heard of any of my other patients to whom it has happened. Indeed, the manner in which a closure of the pupil takes place, renders it impossible such an event can ever occur, unless an adventitious membrane be formed from a subsequent inflammatory attack, of which I have never seen but one instance.* An obliterated pupil is caused either by inflammation of the iris, or by a protrusion of a part of that membrane through an opening in the cornea. In the former case, which most frequently occurs, it is distinguished from inflammatory attacks of other parts of the eye, by the pupil becoming progressively smaller, and of an irregular form. At the same time, coagulable lymph having been effused from the posterior part of the iris, it at first simply agglutenates that membrane to the anterior surface of the capsule of the crystalline lens; but, if left to the natural course of the disease, it becomes in time organised, and permanent adhesions are thus formed between the iris and the capsule during the contracted state of the pupil, which is consequently deprived of the power of expansion after the inflammation is removed. It appears then that two parts are necessary to produce an obliterated pupil in cases of inflammation of the iris, namely, its circular fibres or sphincter muscle, and the capsule of the lens. When the operation I have recommended is successfully performed, the circular order of the fibres are completely divided, and the capsule with its lens becomes absorbed. Thus then the two causes by which a closure of the pupil in inflammation of the iris takes place, are effectually removed. When obliteration arises from a protrusion of a part of the iris through an opening in the cornea, the remaining portion is so much stretched, that as soon as the central incision is made, the radiated fibres immediately contract, and leave an opening nearly circular, which can never again become closed. If, however, before the capsule is entirely absorbed, adhesions should again form between the iris and the capsule, and the newly-formed pupil be in consequence lessened in size, or entirely closed, the operation may be repeated as often as is necessary, without diminishing the prospect of ultimate success, as the repetition will not produce any opacity in the cornea.*

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* Vide Case 15.

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* Vide Case 14.

By introducing the artificial pupil-knife with its edge downwards, and afterwards turning it backwards in the manner described by Cheselden, I found that a space was thus left by the side of the knife in the coats of the eye, through which the aqueous humour, and sometimes the dissolved vitreous humour, made their escape so copiously, as to cause a collapsion in the coats, whereby a division of the iris was rendered impracticable, which appears, from the same cause to have happened to Mr. Saunders. † When the knife is introduced in the manner I have recommended, this escape of the humours can but very rarely occur, until the operation is completed, and the knife withdrawn ; and it is then attended with no bad consequence, as the fluid that escapes becomes quickly regenerated. Another cause of the frequent failure of Cheselden's operation must have been the small size of the opening through the iris, made by one incision, which he does not recommend to be repeated. With the improved knife I now use, which cuts as sharp as a lancet, I have very seldom succeeded by the first incision, but have repeated it in the manner already described, until the aperture in the iris is of a proper size. It is probable also, that in order to ensure success, the surgeons who unsuccessfully tried Cheselden's operation, made use of such a degree of pressure in withdrawing the instrument, as to cause a separation of the iris from its ciliary attachment, as occurred to Mr. Sharp. This consequence is much more likely to ensue, where an obliterated pupil is complicated with cataract, than where a closure of that aperture succeeds the removal of the lens, and should therefore in those cases be more particularly guarded against, and in repeating the cuts great care should be taken that the edge of the knife be confined to the same line in the iris, otherwise the margin of the pupil will be uneven, and the patient's vision very probably injured in consequence. On this account, this part of the operation requires a considerable share of steadiness both in the operator and the patient, as well as to avoid detaching the iris from the ciliary ligament; for if this should once occur, it will be impossible to effect a central aperture afterwards, the separation of the iris being increased by every further effort to accomplish the former object. A leading principle, which

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* Vide Case 13. † Vide Letter, inserted page 28.

I cannot impress too strongly on my reader's attention, and which should never be lost sight of in performing the operation for central artificial pupil, is to make a large division of the iris. No ill effects in respect to vision need be dreaded from its magnitude, as the eye-lids involuntarily become in part closed when the eye is exposed to a strong light, by which the superfluous rays are excluded, thereby performing the functions of the sound iris,* while a liability to a re-closure of the pupil, a contracted sphere of vision, and consequently a very imperfect sight, are the certain consequences of a small opening. This is strikingly manifest in John Mercer,† from whose eye, by repeated operations, performed with great skill and success, the cataract was removed, and the patient enabled to see minute objects distinctly, when placed immediately before him; yet, in consequence of no division having been made in the fibres of the iris, the pupil was so small, that the lateral rays of light were prevented from passing through it in sufficient quantity to enable him to avoid objects sideways by day, or to find his way alone with safety by night.

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* Vide Cases 6 and 15.

† Vide Case 10.

In all cases of artificial pupil, that aperture remains stationary. Its size will not be influenced by the application of belladonna, or by the strongest light. When the natural pupil has been closed for many years, the radiated fibres of the iris have generally lost in part their contractile power ; and I have often found it useful, in such cases, to stimulate the iris with the point of my knife, and with it also to stretch open as much as possible the newly-formed pupil, where there was no lens to place within the edges of the wound ; and I have sometimes observed, that the fibres, although at first immovable, have contracted in a day or two.* An obliteration of the pupil is often complicated with other diseased states of the eye, more especially a disorganised state of the vitreous humour, and a partial or total insensibility of the retina. The diseased state of the vitreous humour cannot be ascertained previous to an operation, unless part of the fluid is absorbed ; the eye-ball is then diminished in size, and feels soft to the touch. If no absorption has taken place, though it may be perfectly disorganised, yet the distention of the coats, and the consequent firmness of the eye, will be preserved. It is some consolation, however, to know, that all hope of rendering benefit, even in this complicated state of disease, is not lost, as may be seen in Cases 5 and 7. It is still more difficult, before the operation is performed, to ascertain the actual state of the retina. In some cases requiring central or lateral pupil, where the patients could see light and colours, and discern the motions of objects, they have derived no benefit from the operation, although it was perfectly accomplished; while, on the contrary, in others, when urged by the importunities of my patients, I have operated almost contrary to my judgment, the most favourable result has ensued.—The form of the artificial pupil varies considerably. When the crystalline lens has been previously extracted, the newly-formed opening is in general nearly circular; but where a closure of the pupil is complicated with an opaque capsule or lens, or with both, the artificial pupil will be of a transverse oblong shape.* The form, however, is of little consequence in respect to vision, as long as the opening is of a sufficiently large size.

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* Vide Case 9.

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* Vide Plate II. Figure 2.

Convex glasses, similar to those used after the operation for cataract, are always necessary in cases of artificial pupil; and great care must be taken, in their adaption to a lateral pupil, that the focal point be placed opposite to it, otherwise they will be of very little use. These are the principal observations which occur to me on this important subject; and I trust I shall not be accused of presumption when I venture to express my belief, that the certainty of final success in accomplishing the various operations here described, and the practicability of frequently repeating them, if necessary, without endangering an opacity of the cornea, or any other irremediable disease of the eye, will render this Treatise an acquisition in the Ophthalmic branch of Surgery. I now present it to the notice of the Public, with a fervent hope, that by the general adoption of the practice which it recommends, many an unhappy sufferer, who hitherto has been doomed to continue in darkness, will be restored to the inestimable blessing of sight.

CASE V.

Susannah Goby, of Spesbury, near Blandford, ætat. 30, labouring under closed pupil, was recommended as an in-patient to the West-of-England Infirmary for curing diseases of the Eye, March 1810, by Sir Thomas Acland, Baronet, one of the Committee of that establishment. She stated, that seven years before, from exposure to cold, a violent inflammation came on in both eyes; which, though lessened by surgical aid, could not be entirely removed for six or eight months, when her vision became so much impaired, that she could only see large objects, and even those very imperfectly. At the termination of five years from this period, she underwent an operation on each eye, in the Salisbury Hospital; but of what nature I could not clearly understand, for though she stated, that a fellow-patient told her there had been a film like a cobweb taken out of each eye, yet, on the most accurate inspection, I could not perceive any appearance of a cicatrix in either cornea. The eyes were considerably smaller than the natural size, and very soft to the touch, apparently from a dissolved state, and a deficient quantity of the vitreous humour. The iris in both had assumed a greenish hue, and the pupils were contracted to the size of a small pin's head. She could discern light from darkness, and perceived the motion of bodies when passed immediately before her. As the left eye was not so much reduced in size as the right, I conceived it would afford the greatest chance of success to the operation, and accordingly, on the 8th of April, I proceeded, in the presence of my late colleague, Mr. C. T. Johnston, to make a central division of the iris, the radiated fibres of which instantly retracted, and formed a pupil of a large size. I next endeavoured to separate the capsule from its adhesions to the posterior part of the iris; but not finding this readily accomplished, and dreading the escape of the disorganised vitreous humour, I desisted at the time from any further attempts. The iris having been much stretched by these efforts, she complained of a slight pain during the operation; but no inflammation ensued. April 15th, with a needle curved somewhat less at the point than Scarpa's, I detached, and afterwards pushed the capsule in a mass through the newly-formed pupil into the anterior chamber.

The patient experienced considerable pain, and in the course of the day inflammation came on. This however yielded to the application of six leeches to the eye-lids, and at the expiration of a week, the eye was as free from redness as previous to the operation.

At this period I was called to Bath, in order to operate on several cases of cataract; in which city, by permission of the Committee, I remained for a considerable time. Mr. Johnston, however, informed me, that during the first month, the capsule rapidly diminished in bulk, but that no material alteration was observable in the subsequent three or four weeks. On my return I found the pupil nearly circular, and considerably larger than the natural size; but, except a small part towards the internal canthus, it was still obscured by the remainder of the capsule, which had, however, become much thinner, semi-transparent, and full of small holes. By the assistance of cataract spectacles, she could see to read small print. Being confident of the ultimate disappearance of the capsule, and the bed she occupied being much wanted, this patient was discharged, July 1st, 1810.

In the beginning of January, 1812, the friends of a young lady, whose eyes were affected in a similar manner, at my request wrote to Dr. Heywood, a physician of eminence residing at Blandford, to inquire the state of Susannah Goby's eye at this period, who returned for answer, that the remainder of the capsule had nearly but not entirely disappeared; "that her vision was much better than could have been expected before the operation, for which she felt very grateful."

CASE VI.

During my stay in Dublin, in 1811, my assistance was solicited in behalf of Henry Ledwith, a pauper who had been a coachman in that city, aged 46. This poor man was affected with a cataract in his left eye, while the pupil of the right had become nearly obliterated in consequence of the extraction of the opaque crystalline, thirteen years before. The upper edge of the pupil in the latter eye was dragged down, below the opacity in the cornea, caused by the former operation. He could discern light and colours, but could not distinguish the largest objects. I performed the operation for closed pupil, on the 25th of June, in the presence of my highly respected friend Mr. Stewart, the Surgeon General, and most of the eminent Surgeons in Dublin. I succeeded in making a central division of the fibres of the iris, two thirds the extent of its diameter, excepting one spot in the centre, which remaining entire, and the original pupil being enlarged, owing to the retraction of the iris upwards, three distinct openings were formed, each large enough to admit of accurate vision. There was no capsule, and the patient was enabled immediately after the operation to see minute objects. When the bandages were removed at the end of eight days, he saw to read distinctly with the assistance of convex glasses. It may here be proper to remark, that this patient did not experience that confusion of vision, which might *a priori* have been expected, though many objects appeared to him doubled. July 22d, I operated a second time on this eye, and cut through the remaining parts of the iris, which separated the three apertures ; thus forming them into one large pupil, nearly circular, and more than three times the natural size. He now no longer perceived objects double, and saw much more distinctly than before. At the time of performing the first operation on the right eye, I endeavoured with a double-edged needle to cut in pieces the cataract in the left; but being very hard, the capsule immediately separated from its ciliary attachment, and as the vitreous humour did not afford sufficient resistance to enable me to accomplish the division, I endeavoured to depress it out of the axis of vision.—It however again returned to its natural situation. Some time after this, at the request of the patient, I performed the operation of extraction; but the moment I had completed the section of the cornea, the opaque crystalline escaped through it with considerable force, and was followed by the greater part of the vitreous humour, which was perfectly fluid. So considerable an inflammation ensued from the protrusion of the iris, that notwithstanding he was copiously bled, the eye suppurated, and was lost. As the eye was of its natural size and hardness previous to this operation I had no reason to suspect that the vitreous humour had undergone such a morbid change.

CASE VII.

The Reverend Doctor Jessop, of Mount Jessop, County Longford, Ireland, ætat. 70, consulted me, during my stay in Dublin, in 1811, respecting an affection of his eyes, by which he had been for a long time deprived of sight. Besides labouring under cataract, complicated with gutta serena, in his right eye, which necessarily rendered every attempt to afford relief by an operation hopeless, the pupil of the left eye had become closed, subsequent to the extraction of the lens, by the Baron De Wenzel, more than twenty years before. In addition to this circumstance, full two-thirds of the lower part of the cornea had become opaque in consequence of the above operation. The Doctor informed me that a considerable protrusion of the iris through the section of the cornea followed the extraction of the crystalline, which occasioned great irritation and pain for three months, at the termination of which the tumour disappeared; but he found himself only capable of discerning light and brilliant colours.

Early in July 1811, in presence of that highly respectable surgeon, Mr. Richards, president of the

Royal College of Surgeons, Dublin, I performed on this eye the operation for closed pupil. After dividing the fibres of the iris, opposite to, and co-extensively with the transparent part of the cornea, near its upper margin, without much difficulty, I found the opaque capsule remaining, and very much thickened ; this I pushed below the new pupil. The patient complained of no pain during the operation, nor did the least inflammation succeed. For the first four days, his vision did not amend ; but afterwards began gradually, and progressively to improve, and in a fortnight, he was able to decypher the seconds marked on a watch dial, small print, &c. In this case, (as well as in several others, after the failure of extraction), I have found the vitreous humour in a dissolved state ; for on withdrawing the instrument, so much watery fluid escaped through the puncture it had made, that the coats were nearly drained, and became flaccid, but in less than twenty-four hours the eye had regained its natural hardness. Although the vitreous humour was perfectly disorganised both in this and Case VI, yet the eye-balls having preserved their natural hardness, it was in neither instance suspected previous to the operation.*

CASE VIII.

Sarah Williams, of Hunsum near Tiverton, Devon, was admitted an out-patient of the West-of-England Eye Infirmary, August 20th, 1810. She stated, that eight months before, the prong of a fork had been thrust by accident into her eye, which produced a violent inflammation, that continued for several weeks, and terminated in the total loss of vision in that eye. On inspection I found the pupil wholly impervious. Part of the iris, having protruded through the opening made in the cornea by the fork, still adhered to the cicatrix. On the 24th of August, I made a large transverse opening in the centre of the iris, and afterwards, carrying the knife through this aperture into the anterior chamber, separated the adhesion it had contracted to the cornea. The iris instantly receded to its natural situation, and the anterior chamber resumed its original capacity. Some fragments of opaque capsule remained, which having been broken in pieces, were soon absorbed, when the pupil appeared of a larger size than usual, perfectly clear, and nearly circular. The patient did not complain of pain from the operation, nor was there any subsequent inflammation. She was discharged, cured, in three weeks after her admission, and saw as well with that eye as with the other, by the assistance of a convex glass of two inches and a half focus.

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* After these sheets had been sent to the press, I received a letter from Doctor Jessop, in as good hand-writing as could be expected from a gentleman at his advanced period of life, even had his eyes never suffered from disease. In this letter says the Doctor, "I can see to play at whist, and every game at cards, without a mistake, nearly as well as I ever did.—I write all my own letters, and walk about my demesne, at Mount Jessop, with ease and satisfaction, being able to see the house, windows, and door, across the lawn, a distance of a quarter of a mile. The capsule has fallen beneath the pupil, but is not dissolved—the old opacity in De Wenzel's eye is almost quite clear; which, I think, must be owing to the effect of the opiate wine which you recommended me to use. Ledwith, the coachman, (Case VI.) sees as well as you do yourself."

CASE IX.

About the beginning of May 1811, when at Bath, I was consulted by James Nash, a carpenter, of Wilton in Wiltshire, who had lost the sight of his left eye. On examination I found the pupil closed, which had been occasioned by a splinter of iron striking his eye nearly five years before, while driving a nail. The splinter had penetrated through the inner part of the cornea close to its junction with the sclerotica, and so much of the iris protruded through this opening, that the natural pupil was dragged under the cicatrix, and not larger than a pin's head. He could see colours and the motion of objects, but nothing farther. I operated on him, May 3d, in presence of my friend Dr. Chicester and several other gentlemen of Bath. I introduced the knife in the usual manner, and made an opening of a large size, through the centre of the iris, and opaque capsule, (the crystalline lens having been absorbed); but the radiated fibres of the iris did not, as is usually the case, immediately retract, though I repeatedly stimulated the iris with the point of my instrument. Some of the detached pieces of capsule fell into the anterior chamber, but the greater part remained in situ. Next day I removed the dressings to examine the eye, and was surprised to find, that the fibres of the iris had receded, and very much enlarged the newly-formed pupil, which was of a transverse and oblong shape. The fragments of capsule in a flocculent state occupied a large part of the newly-formed pupil, notwithstanding which the patient could read with this eye assisted by a convex glass. No inflammation occurred during any part of the treatment, and within a fortnight from the period of the operation, the fragments of the capsule had entirely disappeared, and he returned home able to see the minutest objects.

CASE X.

John Mercer, Market-row, St. James's, was brought to me the middle of January 1812, by one of my patients recently cured of cataract. He stated that, in May 1809, he was attacked in the night with acute inflammation in both eyes; this in a day or two was succeeded by the appearance of dark streaks floating before them, which prevented his seeing objects distinctly. Shortly after, he was struck by the tail of a horse, in his left eye, with such violence, that an opening was made in the cornea, through which was protruded a small portion of the iris. Total blindness in this eye was the consequence, and the inflammation in the other not decreasing, he was obliged, in less than a fortnight after the accident, to relinquish his employment as a coachman. He then applied and was admitted as an out-patient to an eye infirmary. Becoming however progressively worse, after four weeks regular attendance, he procured admission into a general hospital, where he remained three months without receiving the slightest benefit, when he applied for his dismission. Unwilling, however, to relinquish all hope, he once more solicited admittance, and was received into another infirmary for curing diseases of the eye, where, in the course of six months, he underwent five operations in the right, and three in the left eye, for contracted or what is usually termed obliterated pupil complicated with cataract. The benefit which he received from these operations, was as great as the nature of the case admitted, without an enlargement of the pupil by a division of the fibres of the iris. The clear aperture in the right eye was of the size represented in Plate II, Figure 1. In the left eye, though the pupil was larger, nearly round, and perfectly free from all opacity, yet he saw with it very imperfectly, from which I conceived, that the retina was injured by the blow he had received. With the right eye he could at times discern minute objects with distinctness when placed immediately before him; but occasionally when walking, the dark streaks already noticed presented themselves in such a manner as to induce him to stop suddenly, fancying that something which appeared to cross him would impede his further progress. He walked in the streets by day without a guide, but from the smallness of the pupil his sphere of vision was so circumscribed that he could with difficulty avoid objects, unless immediately before him; and on one occasion had been nearly run over by a carriage crossing him at a right angle, which he did not perceive till the pole struck him. At night he never but once ventured abroad without a guide, as he could not see to avoid obstacles however large unless when nearly in contact with them. He was extremely anxious I should perform an operation, " which would enable him to see sideways," but, as he had been so recently under surgical treatment, I hesitated to comply with his request. Observing my hesitation, he informed me, that since his dismission as an in-patient from the last-mentioned institution, he had repeatedly applied for the purpose, if possible, of obtaining further benefit, but was advised to rest contented, and not to risk the loss of what he had already gained. Under these circumstances, I resolved to operate on the right eye. And on the 2d of January 1812, made a large aperture in the centre of the iris, and formed a pupil transversely oblong. * It was perfectly clear, excepting at the external canthus, which was occupied with a minute portion of opaque capsule. No pain or inflammation succeeded the operation. In a week, the patient could read small print at a moderate distance; but the dark streaks still occcasionally floated before his eyes. These however gradually lessened, and his vision daily improved. In another week he could see his fingers and nails, when his arm was extended to the utmost, at right angles with the body, nearly as

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* Vide Plate II. Figure 2.

distinctly as he could before I saw him, when they were placed before his eye.

The poor man expressed to me, in the liveliest terms of gratitude, the confidence and security with which he could then walk through the streets. At the end of three weeks, he told me, he was capable of seeing the earthen pots on the chimnies, trees, &c. half across Hyde Park, and the streaks had very much lessened; I now observed for the first time a small filament of capsule, apparently not larger than a hair, which adhered to the posterior part of the iris, and waved about in the vitreous humour. At first I thought this was the cause of the black streaks before mentioned, which although very much lessened, yet remained to a certain degree; but on further consideration it was evident this opinion was hastily formed, as this was one of the first symptoms under which he laboured when originally attacked with inflammation. He is now able to walk the streets at night as well as by day; and he informed Doctor Warren of Albemarle-Street, to whom I showed this case, that he had seen to tell the exact time by St. James's Church clock across Piccadilly by moon-light, and had repeatedly read writing and small print by the light of a candle, whereas, before he became my patient, he could not see sufficiently well to feed himself with comfort by that light. He considers his powers of vision more improved after night than even by day.

CASE XI.

Richard Bligh, of Liskeard, Cornwall, aged 33, by trade a shoe-maker, had been in the Navy about six years, from which he obtained his discharge on account of a pulmonic affection, and worked for two years at his former trade. In the year 1803, from exposure to cold while in a state of intoxication, he was attacked with violent inflammation, first in the left eye, and a month afterwards in the right. For this complaint he was attended by a respectable surgeon for five months, whose treatment though judicious was not successful, as at the end of this period, when the inflammation was subdued, his vision was wholly destroyed, and he continued perfectly blind until admitted a patient in the West-of-England Eye Infirmary, 27th of April 1809.—On examining his eyes I found the right eye sunk within its orbit from preceding suppuration, while the pupil of the left was not larger than the head of the smallest-sized pin, and that aperture was filled up by an opaque substance. The adhesions between the posterior part of the iris and the anterior portion of the capsule were so firm, as wholly to resist the action of the belladonna. He had a faint perception of a strong light, but could not discern even the outlines of objects. On the 30th of April I performed the operation on this patient, in the presence of Mr. Hockin and my late colleague Mr. C. T. Johnson. It was attended, as is usual, with little pain, no blood appeared in the anterior chamber. The lens, which was transparent, and the opaque capsule, were cut in pieces and placed so as to act as a plug to prevent a re-closure of the divided iris. Immediately after the operation the rays of light were admitted through the newly-formed aperture sufficiently to enable him to distinguish objects. He was then ordered home to bed, and to abstain from animal food and fermented liquors. These injunctions he so entirely disregarded that he got drunk the evening of that day, prior to which excess he was easy and perfectly free from pain. The next morning I found he had considerable inflammation, and immediately bled him ad deliquium.—This removed all unpleasant symptoms, and no further medical treatment was required during his cure than gentle aperients. The lens, from its exposure to the aqueous humour, in a few days became opaque. In three weeks the solution and absorption commenced, and proceeded so rapidly as to leave the pupil, which was of a transversely oblong shape, nearly clear ten days after. He could then see minute objects, and in six weeks from the operation was discharged cured. A month after his return home he walked from Cornwall to Exeter, a distance of 60 miles, as conductor to a blind relation, who in consequence of his cure wished also to become an Infirmary patient. After the lens had become absorbed, as an experiment, the belladonna was applied, but had not the least effect in enlarging the size of the pupil. Two years after this, I heard his vision was so much improved that he had resumed his employment as a shoe-maker.

CASE XII.

Catherine Spelman, Kilbeggan, County Westmeath, Ireland, ætat. 31, about five years ago was attacked with inflammation, which ended in closed pupil in her right eye, and an enlargement and complete amaurosis in the left. She applied to me, in Dublin, June 16th 1811, when she could very indistinctly discern colours and the motion of objects with her right eye. I performed the operation by dividing the fibres of the iris in the usual manner, and plugging up the opening by pieces of the cataract, the remainder of which I pushed into the anterior chamber. She had considerable inflammation after the operation, which was removed by bleeding, purgatives, &c. The absorption went on so rapidly that in five weeks the newly-formed pupil appeared pefectly clear, when she could see the smallest objects. The pupil was about a line in width, and extended very nearly across the whole extent of the diameter of the iris. When the minutes of this case were taken down, the patient was examined by Doctor Hartegan, the eminent professor of anatomy, Trinity College, Dublin, in whose presence, assisted by cataract spectacles, she threaded a small needle with great ease.

CASE XIII.

John Curtis, from Lancells in Cornwall, ætat. 23, was admitted an out-patient of the West-of-England Infirmary for diseases of the eye, July 1810. For two years he had had inflammation in both eyes, which resisted every means employed to arrest its progress, and at last terminated spontaneously, leaving him quite blind. I found one eye so much diseased as to afford no chance of relief. The pupil in the other was not larger than a pin's head, and the capsule, which was opake, filled up this small opening. He saw light, colours, and the motion of objects indistinctly when passed before this eye, but could not walk without a guide:—a few days after his admission, he underwent the operation for obliterated pupil. The transverse opening I made in the iris was not of so large a size as I afterwards found necessary, but it was filled up by pieces of the cataract. No inflammation succeeded the operation, and for three weeks he went on well; when, from exposure to cold out of doors, such violent inflammation supervened as required bleeding, leeches and blisters to remove. During this interval, a period of six weeks, the artificial pupil had contracted so much in size as to induce me to repeat the operation. I then succeeded in removing the remaining portions of cataract and effecting a considerable enlargement of the opening; a small quantity of blood became effused in the anterior chamber, and a slight inflammation ensued, which was quickly removed by the application of a few leeches. He was discharged perfectly cured, fifteen weeks from his admission. At this time the extravasated blood in the anterior chamber had disappeared. Some opacity also of the cornea, which existed when he first applied as a patient, was nearly gone. By the aid of cataract glasses he could distinctly see any object, letters, and even the minute and second marks on the dial of a watch, while his vision continued daily to improve.

CASE XIV.

Colonel V—, about twenty-seven years since, was attacked in the Island of Jamaica with an acute inflammation in the left eye, which terminated in a complete closure of the pupil. Having obtained leave to return to England, he consulted the late Mr. Pott and the Baron De Wenzel, who concurred in opinion that the retina was the seat of disease, and advised the use of electricity. As might be expected, no benefit resulted from its application. He remained in a state of nearly total blindness in this eye, (being able only to distinguish light and brilliant colours) till the beginning of June 1811, a few days previous to which period he consulted me in Dublin. I found the pupil of the left eye not larger than a pin's head, and this small aperture filled by opaque capsule, which firmly adhered to the posterior part of the iris. From the length of time the disease had existed, and the many eminent surgeons and oculists who had pronounced the case incurable, I had great difficulty in persuading him to submit to any operation on it. However, he at length consented to undergo that for artificial pupil, the same day that I operated on a dark-coloured cataract, which four or five years before had formed in his right eye. The 1st of June, in presence of most of the respectable surgeons in Dublin, I cut up the anterior part of the cataract in the right eye very freely,—the fragments of which fell into the anterior chamber. Some inflammation ensued a few hours after the operation, which was removed by the usual treatment. At the same time I performed the operation for a central artificial pupil in the left eye, and made the transverse incision full two-thirds of the diameter of the iris. I found the capsule most inordinately thickened and adherent throughout its whole extent to the posterior surface of the iris. With some difficulty I cut it in two; but, notwithstanding repeated and long-continued attempts, could not succeed in detaching it. A small part of the nucleus of the lens still remained within the capsule, which on being divided fell into the anterior chamber. A few drops of blood from the divided vessels of the iris rendered the aqueous humour somewhat turbid. I stimulated the iris with the point of my knife, for the purpose of getting the radiated fibres to contract; but for so many years having remained motionless, they were then very little sensible to its action. In ten days, however, they had contracted so much as to pull open the pupil nearly half a line in breadth; a week afterwards, the blood having become absorbed, the patient was enabled to mark the time on a watch-dial, and with the assistance of glasses could read the smallest print. A fortnight after inflammation came on in this eye without any assignable cause, which assumed an intermittent character, and was ultimately removed by large doses of bark administered by day, and a calomel pill at night. An adventitious membrane was formed during the continuance of the inflammation, which occupied a large part of the centre of the artificial pupil, and partly obstructed the passage of the rays of light; nevertheless he could read and write with this eye. I resolved however to repeat the operation, and not only to remove the obstructing membrane, but also further to enlarge the pupil by detaching the adherent capsule from the iris. These objects, the beginning of August, I perfectly accomplished,—but it was attended with considerable difficulty to myself, and pain to the patient: no inflammation ensued. For some time previous to this the pieces of cataract which had fallen into the anterior chamber of the right eye were absorbed, but the pupil was still obscured by the remaining part. As I thought it of that description which would speedily dissolve by a second operation, after loosening its texture considerably, I pushed it into the anterior chamber; but its solution was so slow, in consequence of the nucleus not having been divided, that it mechanically irritated the iris, and kept up inflammation in the eye for a considerable time, although so much diminished in size as to leave the pupil clear, which enabled him long before I quitted Ireland to see perfectly with this eye by the assistance of glasses. In this case it was my intention to have made a puncture in the cornea, for the purpose of extracting the remaining small portion of nucleus which kept up the irritation, and it was once actually determined on; but I found my patient could not keep his eye sufficiently steady without the application of the speculum, which very probably would have caused a considerable protrusion of the iris. I therefore suffered it to remain, knowing it would soon become absorbed. When I last examined the eye, the nucleus had diminished to the size of a flax seed, since which period I have not heard of my patient.

CASE XV.

Mrs. S——, an elderly lady, No. 32, Great Winchester-street, Broad-street, City, about twenty-four years since was affected with repeated attacks of deep-seated inflammation, which ended in depriving her of vision in both eyes, notwithstanding the best professional advice was obtained. She consulted me April 1811, and stated she had been totally blind fifteen years in the right eye, and nine years in the left; that it was the opinion of the different oculists under whose care she had been during the period she suffered from inflammation, that the retina was the seat of disease, and the case therefore hopeless. She had applied to Mr. Saunders a short time previous to his death, whose opinion was also unfavourable, and who discouraged her from undergoing any operation. On examination I found the right eye considerably enlarged, with black protuberances in different parts like small staphylomas; the pupil closed, crystalline lens opaque, and the retina totally insensible.—Nothing therefore could be done to this eye.—In the left the pupil was closed and the lens opaque: she could perceive light and brilliant colours, but the general appearance of the eye was so unfavourable, that I then declined performing any operation, and on my return to London last December would not undertake that for closed pupil, unless the trial was sanctioned by the opinion of some surgeon of eminence. My late anatomical teacher, Mr.

Astley Cooper, was consulted, who advised the operation, which I accordingly performed a few days afterwards. I introduced the artificial pupil knife in the usual manner, and made a very large division of the iris in the line of its central diameter.—Having separated all connexion between the opaque capsule and the posterior part of the iris, I found that some of the fibres were broken off at the same time; these afterwards became absorbed, and left the artificial pupil of a very large size.—The vitreous humour did not afford a sufficient counter-resistance to enable me to divide the thickened capsule; I therefore postponed any further attempt to accomplish this object, although it occupied the whole extent of the opening behind the iris. During the operation my patient suffered little pain; but as in the evening she felt some uneasiness, I ordered her to be bled, which, with the repeated exhibition of small doses of tinctura digitalis, in a few days arrested the progress of all inflammatory action. The opaque lens with its thickened capsule, which were of an unusually large size, in less than a fortnight had spontaneously sunk in the vitreous humour, and left a small portion of the upper part of the pupil clear, which enabled her to discern objects. In five weeks the half of the pupil was clear, and with the assistance of convex glasses she could read the smallest print.

The beginning of April, 1812, when the latter part of this case was noted down, the opaque lens having sunk beneath the lower edge of the pupil—the whole extent of the artificial opening was clear while the eye remained steady; but on moving it quickly, the cataract floated about in the vitreous humour in a most extraordinary manner, seeming occasionally, when the eye was moved for a moment, to obscure the whole pupil, but as soon as the eye again became stationary (if sitting erect), it instantly sunk below the axis of vision.

This opaque body appeared not the least diminished in size: but, as she was able to read small print for several hours together, without inconvenience, and even to thread a small needle, I did not judge it advisable to attempt a division of the capsule, for the purpose of effecting its absorption.—The very large size of the artificial pupil is here of the greatest advantage; for had it been smaller, vision would necessarily have been completely obscured, during the floating of the cataract, as often as it rose above the transverse diameter of the iris; whereas she is not sensible of any obstacle, unless when the head is held forward. The strongest sun-shine is not distressing, as the eye-lids involuntarily become in part closed, and shut out the superfluous rays of light. This fact I have uniformly remarked where the artificial pupil has been of a very large size. The vitreous humour, I should conceive, is wholly disorganized, from the spontaneous depression of the cataract, and its floating up and down so readily. The most extraordinary circumstances in this case are, the gradual sinking of the cataract, and that it has never appeared either to float towards the back part of the eye, or to sink below its usual seat.—In general its convex surface is towards the iris; but it sometimes appears to roll when it moves in the eye.

CASE XVI.

WHILE I was in Dublin, a poor man, who had been a patient in the London Infirmary for curing diseases of the eye, consulted me on account of a considerable enlargement in his right eye, and very indistinct vision in the left.—He suffered great pain in his forehead and cheek from pressure caused by the enlarged eye, and rather more than the inner half of the cornea of the other was obscured by a dense cicatrix. There had been a considerable protrusion of the iris through an ulcerated opening in its cornea, and the pupil, which was partly obscured by the cicatrix, was very small. When discharged from the Infirmary, Mr. Saunders had given him some of the extract of belladonna, which he applied constantly for two years, and during that period it had produced its specific effect of enlarging the pupil, thereby affording useful vision. Some time previous to my seeing him, he had discontinued the use of the belladonna, as it ceased to produce any effect. I however tried it again, when it acted as powerfully as before. I first performed the operation of excision of the cornea on the enlarged eye, by which the humours escaped, the eye lessened, and sunk within its orbit, when all pain in the forehead and cheek ceased. A short time before I left Dublin, assisted by my nephew Mr. Hockin, I performed the operation for lateral pupil in the left eye, by dividing the iris very nearly from the junction of the sclerotic coat to the edge of the opacity in the cornea, and then freely cut in pieces the crystalline lens and its capsule, which were both transparent. I placed a part of these in the anterior chamber, the remainder I used as a plug to prevent the incision in the iris from again uniting. The man immediately exclaimed that he could see objects more distinctly than before; but in two or three days the divided portions of the lens becoming consequently opaque, this increase of vision was for some time lost. Some inflammation ensuing, he was bled; which, with warm applications, &c. soon relieved him. Soon after the operation I quitted Dublin for England; prior to which the divided lens had assumed a flocculent appearance, but his vision had not much improved. My nephew, however, who remained some time after my departure, informed me, that when he left Dublin, although the artificial pupil, which was of a large size, was still much obstructed by the remaining parts of the lens, yet his vision was considerably better than when I first saw him. I have not since heard of him; but from the large size of the opening made in the iris, and the certainty of the remainder of the cataract becoming absorbed, there can be no doubt but this case has terminated in the manner I wished and expected.

CASE XVII.

William Dangerfield, a soldier, was one of the unfortunate sufferers from the Egyptian ophthalmia, which had left indelible opacities in the central parts of the corneæ. During the acute stage of the disease, the iris had protruded so much in both eyes as to obliterate the pupil in each, a very small portion only of the cornea remaining clear round its juncture with the sclerotic coat.—The patient could only distinguish light and colours. Four days after his admission as an out-patient of the Exeter Eye Infirmary, he underwent the operation for artificial pupil in his left eye. I introduced the knife at the upper part of the eye above the level of the pupil, to prevent the escape of the aqueous humour, and with one cut of the instrument divided the whole of the iris opposite to the remaining clear part of the cornea. The newly-formed pupil was consequently perpendicular, instead of being transverse. No inflammation ensued.—A fortnight after, I operated on the right eye, and succeeded in dividing the iris in a similar manner; but here there was a good deal of subsequent inflammation, which required bleeding, poultices, &c. to subdue. A chronic species of ophthalmia remained for nearly six weeks, which kept up an irritation in the eye, but at the end of that period the lens had wasted so much as to leave the newly-formed pupil nearly clear.—The absorption of the lens in the left eye not proceeding so rapidly as I wished, I introduced a cataract needle, and cut it into small pieces, the greater part of these I pushed into the anterior chamber. Some inflammation succeeded, but was soon removed by the application of a few leeches, and at his own request he was discharged the beginning of October, before the whole of the lens was entirely absorbed in either eye. The opening in the iris of each eye was of a large size; but from their lateral situation, he was consequently obliged to look at objects obliquely. He could find his way without the assistance of a guide, and by the help of suitable convex glasses could see small objects with tolerable distinctness—but his sight was certainly very inferior to that which commonly results from the central artificial pupil.

CASE XVIII.

Early in the summer of 1811, the child of a soldier belonging to the 7th Hussars was placed under my care, at the request of Colonel Vivian, who commanded the regiment at that time quartered in Dublin. Soon after its birth, from the purulent ophthalmia the cornea of the right eye had become ulcerated through its whole substance, and a slight protrusion of the iris ensued. An adhesion of the edge of the pupil to the cicatrix, consequent to its healing, had so much lessened its size that it was completely obscured behind the cicatrix, and the patient could merely see the motion of objects, light, colours, &c. Under these circumstances, having seated the child in the usual manner as for performing the operation for cataract, I introduced the artificial pupil knife into the cornea about a line anterior to the iris, and liberated the adherent edge of the pupil; I afterwards brought a part of the iris through the opening made in the cornea, by which the natural pupil was dragged opposite to the remaining clear part of that coat. Both these objects I accomplished with facility; the iris, from the pressure of the speculum, immediately after its liberation, protruded through the puncture in the cornea so much as to bring its pupillary margin in contact with the cut.

No inflammation succeeded the operation, and in a few days a weak solution of argentum nitratum was dropped into the eye two or three times a day, which assisted to heal the puncture, and entirely removed the projecting part of the iris. At the end of six weeks, the child could discern small objects both near and at a moderate distance with a precision surpassing my expectations, and which promised a vision sufficient to answer all the common purposes of life.

CHAP. III.

SECTION I.

ON CATARACT.

THE disease of cataract, which is the subject of the present chapter, has been so often and so ably treated of by various authors, that I shall in this as in the two former, confine myself as much as possible to the recital of the various facts and observations which have occurred to me in the course of my practice, and only add what is necessary to their elucidation. For the sake of clearness, however, it is to be recollected that the morbid affection termed cataract, consists of an opacity of the crystalline lens or its capsule, and sometimes of both; when the opacity is seated in the former, it is called lenticular cataract; when in the latter, membranous or capsular cataract.

The formation of the cataract is generally slow in its progress, though this is not invariably the case; neither is its aspect uniformly the same. The pupil at first usually assumes a turbid and muddy appearance, which increases until it becomes entirely opaque. It is observed to be of every shade from a milky whiteness to the palest blue, and sometimes so nearly approaching to the colour of the natural pupil, as to have deceived the most experienced oculists. The lens and capsule are both frequently found to be opaque; at other times the opacity is confined to the capsule. The seat of disease may be either the anterior or posterior part of this membrane, or both these parts may be equally affected. Authors have divided cataracts into several kinds, according to their different degrees of solidity, and the seat of the malady.

Neither age nor sex seems to be exempt from this disease; children are frequently born with it. In adults it sometimes arises in consequence of external violence, or inflammation of the eye, and in these cases it may be regarded as altogether a local disease. Frequently, however, it proceeds from an hereditary disposition, which has existed for several successive generations, while in other cases it attacks several members of the same family, without any disposition of this kind being recognizable in their progenitors. Facts illustrative of these positions are recorded by different authors. Among others, Janin mentions a whole family of six persons who laboured under this disease.* Richter extracted the cataract from a patient, whose father and grandfather had been affected with the same malady, and in whose son, at that period, it had begun to manifest itself. He adds, that he had seen three children all born of the same parents, who acquired cataracts at the age of three years.† During my apprenticeship with the late Mr. Hill, of Barnstaple, I was present, when he operated on two brothers and a sister, all of whom were adults, and who stated that three or four others of their family were affected with symptoms not unlike those they had experienced at the commencement of the complaint. I myself recently operated on two gentlemen advanced in years, who informed me, that they had a brother, on his return from India, who was similarly affected.

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* Observations sur l'Œil, p. 149.

† Richter on the Different Kinds of Cataract, p. 3.

Cataract is not the only disease of the eye, with which whole families are attacked. Mr. Lucas, surgeon of the Leeds Infirmary, mentions, in a paper published in the Medical Observations and Inquiries, Vol. VI. that he had seen a part of a family of five children who were born blind, and from his statement it appears that cataract was not the cause of this blindness. During my residence at Exeter, a poor man brought me two of six children, all born blind from amaurosis; and I have seen part of a family, of several brothers and sisters, all of whom laboured under hemeralopia.

Congenital cataract, like that in adults, consists of an opacity either of the lens, of the capsule,—or of both. The lens affected with this disease is either solid, soft, or fluid; and it is sometimes partially, sometimes wholly absorbed; in the latter case the cataract is termed membranous or capsular. The origin of congenital cataract is necessarily involved in much obscurity, and in many instances, it cannot be traced to any assignable cause: in other cases, however, as in advanced life, it appears successively in several members of the same family, and is also transmitted from parent to child. While in Dublin, I operated on one of seven children, five of whom had congenital cataract, and whose father and grandfather, according to the mother's statement, were both born blind with the same complaint. About the same period I successfully operated for congenital cataract on two children of a Welch harper, of the name of Lewis, who himself was born blind of that disease. He indeed affirmed they were not blind at the time of their birth; however, from the involuntary motion of their eyes, and their complete ignorance of all visual objects, after the removal of the cataracts, I have no doubt, the cases were both congenital. Though this imperfection in the organs of vision may readily escape observation in early infancy, yet I conceive I have not unfrequently observed an unwillingness on the part of parents to admit, that such a defect existed in their offspring at the period of birth. A gentleman consulted me at Exeter, respecting an imperfection in the vision of his son, who had nearly attained his twentieth year. On inspection I discovered, that he laboured under that species of congenital cataract, of a dark slate colour, in the centre, with a transparent edge, which admits a passage for the rays of light sufficient to give an imperfect vision, when the pupil is in an expanded state. As different surgeons had previously examined the eyes of this patient, without ascertaining the real cause of his malady, it was with some difficulty I could prevail on his father to confide in my opinion. He at length, however, consented that his son should undergo the operation for cataract, which I accordingly performed, and the result was of the most satisfactory nature.

It is somewhat singular, and may perhaps be deemed not unworthy of remark, that in all the cases of congenital cataract, which have fallen under my notice, where more than one child in a family have been affected, it has invariably occurred in succession. For example, in the Russell family, consisting of seven children, the two eldest brothers enjoyed perfect vision, while the five younger daughters laboured under congenital cataract.* Captain P—'s eldest daughter, in like manner enjoyed perfect sight, while his three other children were born blind.† The fact observed by Mr. Saunders is still more remarkable, that the same character was preserved in the cataracts of children belonging to one family, though in one instance there was a difference of six years, between the ages of two brothers.* Some writers have attributed this peculiar pre-disposition to a strumous diathesis in the parents. I cannot, however, acquiesce in this opinion; for though I have certainly observed a scrophulous disposition in a few patients labouring under congenital cataract, as well as in others, where the lens has become opaque at an advanced age, yet this association is by no means so general, as to warrant any positive conclusion on the subject.

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* Vide Cases 19, 20, 21. † Vide Cases 22, 23, 24.

Syphilis may be ranked among the causes of cataract; and I am of opinion, in such cases the opacity is always at first seated in the capsule, though it may afterwards sometimes extend to the lens, and generally arises from an inflammation of that membrane, and not from coagulable lymph having been effused from the inflamed vessels of the iris, and deposited on its anterior surface. I was led to adopt this opinion from repeatedly observing, in the commencement of syphilitic inflammation of the iris, that although the pupil was very little contracted, yet the patient had entirely lost the power of discerning objects, and could only distinguish light from darkness. This state of the disease is accompanied merely with a haziness of the capsule, which usually disappears within forty-eight hours after ptyalism has been produced, when vision is again restored to its natural clearness. Had there been any deposition of lymph on that part of the capsule opposite to the pupil, it must have been visible at the previous examinations, and would not have disappeared in so short a time after the action of mercury had shown itself. But what I conceive proves that opacity in the capsule arises from some morbid action in its own vessels, and not from lymph effused by the vessels of the iris, and deposited on the surface, is, that it frequently occurs some months, or even years, after extraction of the cataract has been successfully performed, without any inflammatory action in the iris, and that in congenital cases the density and thickness of the capsule increase in proportion to the length of time it is suffered to remain. I am also strongly of opinion, that in any case of cataract where mercury is found beneficial, the origin of the disease may be traced to syphilis.

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* In a majority of cases I have myself witnessed the same uniformity of character under similar circumstances, though in other instances, as in the family of Captain P. already mentioned, the eldest of the two daughters laboured under slate-coloured cataracts with a transparent edge, while those of the brother and younger sister were fluid with opaque capsules.

Various remedies, internal as well as external, have been at different times recommended for the cure of cataract; a long enumeration of these is useless, as experience has sufficiently demonstrated their inutility. Mr. Ware, indeed, expresses a sanguine hope, that the application of æther and other stimulant remedies to the eye itself, may in a variety of instances supersede the necessity of any operation. The cases, however, where these applications were used, and which are adduced by him in support of this opinion, have all been produced by external violence. It is therefore much more probable, that the lens had been gradually dissolved, and at length finally absorbed by the free admission of the aqueous humour through a breach or puncture, which is generally found to exist in the capsule under such circumstances, (and which is in fact also the proximate cause of the disease), than that the cure had been occasioned by the stimulant quality of the remedies employed. These cases, therefore, cannot in my opinion be deemed conclusive.*

The above reasoning is still further strengthened by the well-known facts, that cataracts are not only frequently dissipated, where no external applications whatever have been employed, but that when originating spontaneously they are often cured by an accidental blow on the eye.

This desirable event is more likely to occur from a rupture than a puncture of the capsule, because in general the aperture is larger, and is not so likely to re-unite. Accidents of this nature are sometimes attended with so little pain or inflammation, that no ill consequences are at first apprehended from them. A short time before leaving Exeter, a countryman applied to me on account of cataract in one of his eyes produced by a flap with a bush, which gave him so little inconvenience at the time, that he took no notice of it. A few days afterwards, however, his wife perceived something white in the pupil, which she forbore to mention, lest it should excite alarm. More than three weeks elapsed, before he discovered, by accidentally shutting his sound eye, that he could not discern objects with the other. On a close examination, I discovered a small rent in the capsule, through which a part of the opaque lens protruded. Having almost immediately left Exeter, I am ignorant whether the pupil became clear, though I should rather apprehend, from the smallness of the opening in the capsule, that this membrane would not dissolve. In another instance, where the capsule was much more extensively ruptured from a similar cause, a large portion of the solid lens had fallen into the anterior chamber. The whole of this lens, as well as the capsule, yielded however to the solvent power of the aqueous humour, and was ultimately absorbed; but amaurosis having been produced by the blow, the patient reaped no benefit from this circumstance.*

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* Whoever has been in the habit of operating for cataract, by separating its texture for the purpose of effecting absorption, must know that the solution of a solid lens in the aqueous humour takes some time to be accomplished; but when the cataract is fluid, it is generally absorbed in a few hours, and sometimes in a few minutes.—It is evident, therefore, that there is no want of activity in the absorbents at any time; hence, these stimulants must be regarded as inefficacious.

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* Soon after I settled in Exeter, my advice was solicited by a Clergyman respecting his daughter, who was affected with congenital cataract in both eyes. He had while she was a child consulted the most eminent oculists in London, who all concurred in declining to operate, till she should be of an age to understand the necessity of keeping her eyes steady; recommending in the mean time the use of æther. This I advised him to lay aside, and explained how utterly impossible it was for any external application to remove a solid opaque lens, such as his daughter's; adding that in those cases, where it was supposed to have accomplished a cure, the effect had been produced by the aqueous humour having come into contact with the lens, through an opening or rupture in the capsule. However, he remained uninfluenced by my argument, and, as I afterwards unstood, he even censured me for calling in question an opinion sanctioned by such respectable authority. It was rather an extraordinary coincidence, that the man whose case I have last mentioned should be one of this gentleman's parishioners, and subsequently recommended by him as a patient to the West-of-England Eye Infirmary. With the view of tranquillizing the poor man's mind, and inducing him to wait for the gradual disappearance of the cataract, I gave him, on his return home, which was at the commencement of its absorption, merely some coloured water to use as a collyrium, and at the same time wrote to the Clergyman, intreating that he would carefully watch its progress, in order to convince himself, that it was not to æther, but to the sole agency of the aqueous humour, that the cure in such cases was to be ascribed.

The solvent power of the aqueous humour in dissolving the hardest substances, is strikingly illustrated by Mr. Cline, in one of his lectures, in which he mentions a case where from a violent spasm of the muscles of the eye-ball, after the point of the knife had entered the transparent cornea, it was broken off, and remained adhering to its inner surface. Mr. Cline examined the eye next day, and found that the point of the knife which had been broken off was become rusty; on the fifth day the aqueous humour was turbid and of a rusty colour. On the tenth day, this muddiness had completely disappeared, and the eye looked well and healthy, the point of the knife having been completely dissolved and removed by absorption. The sight of this patient, who was an old man, was afterwards fully restored by the successful extraction of the lens. In corroboration of this remarkable instance, it may not be here improper to mention, that an eminent surgeon in Dublin had a knife constructed somewhat similar in form to the one he had seen me employ in operating for closed pupil; but in one of his first attempts to use it, it broke, and a considerable part remained in the eye, which, however, produced no inflammation, or ill consequence whatever to the patient. There can be no doubt but the piece was dissolved, though, from being left behind the iris, its gradual disappearance could not be observed, as in the former instance. From these proofs of the powerful solvent nature of the aqueous humour, as well as by the following extract taken from the annual Report of the West-of-England Infirmary for curing diseases of the eye, * it will be seen how utterly unfounded is the opinion of those practitioners, who assert that whatever influence

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* Ages of Persons cured, born blind.—1st Year.

1 Seventeen Months old,
5 Between seven and ten Years,
1 Fifteen,
3 Between twenty and twenty-three,
1 At thirty.
—
11

Ages of Persons cured, born blind.—2nd Year.

1 Ten Months old,
5 Between two and seven Years,
8 Between seven and twenty,
4 Between twenty and thirty,
1 At thirty-four.
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19

Ages of Persons cured of Cataracts, not born with them. 1st Year.

1 Eight Years old,
2 Between twelve and twenty,
5 Between fifty and seventy,
4 Between seventy-one and seventy-four,
1 At seventy-eight,
1 At eighty.
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14

Ages of Persons cured of Cataracts, not born with them. 2nd Year.

1 At six Years old,
6 Between twelve and twenty,
13 Between twenty and fifty,
10 Between fifty and seventy,
6 Between seventy and eighty.
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36

this humour may exert over fluid or soft cataracts, it is yet wholly inadequate to the solution of the hard cataracts of adults and old people.* — A longer time indeed, and sometimes a repetition of the operation, will be necessary to accomplish the removal of a lens which is very hard; but these are trifling objections, compared with the uncertainty of depression, or the danger of totally destroying the organ by extraction.

Celsus, in describing the operation for depressing the cataract, and who used an instrument very similar to that employed in modern times, observes that "if it rises again, it must be more cut with the same needle, and divided into several pieces, which, when separate, are both more easily lodged and give less obstruction."† It should seem, from this passage, that he had observed the cataract to be more readily cured after being cut in pieces, though he must have been necessarily ignorant of its solution and absorption, as at that period nothing was known of the absorbent system. Bannister, an English oculist, who wrote in 1622, in like manner observes, that " there are some cataracts which vanish and scatter as soon as the needle is applied to couch them, because they are not hard and solid to bear the needle, which goeth through them, as it were a green cheese, whereof they are commonly called cataractæ lacteæ, because their colour and substance resembleth milk. That the chirurgeon may meet this inconvenience, he must labour to loose it, pressing it with his needle on every side; for by this means I have seen and proved, sometime the grossest part of the cataract to fall away, and come lower, the thinner part to be loosed and consumed, and in the end the party hath recovered his sight."

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* In a conversation I had with the late eminent anatomist Mr. Shelden, a short time before his death, he was at first fully impressed with this opinion, and it was with great difficulty I could convince him to the contrary.

† Grieves's Translation of Celsus, page 405.

In later times the solubility of the lens has been proved by the celebrated Pott, not only when it was detached from its investing capsule and depressed to the bottom of the eye, but even while it remained in its seat, provided a free admission were given to the aqueous humour, by an opening made in the capsule. Notwithstanding he held these opinions, and like Mr. Hey and Professor Scarpa has recorded many cases in which the capsule was ruptured, and the substance of the crystalline lens broken down and dissolved, yet still they all appear to prefer the mode by depression, when the cataract possesses sufficient solidity. Professor Scarpa lays great stress on the certainty of the lens becoming dissolved in the vitreous humour after having been denuded of its capsule, by which he conceives that the objections to this operation on account of its liability to resume its natural position, is obviated. If then the superiority of his method consists in the certainty of the solution of the opaque crystalline in the vitreous humour, however hard and solid, would it not be preferable, in every case, to subject the lens to the action of the aqueous humour in the first instance? by which, if sufficiently divided, it will be dissolved in a much shorter period without incurring any risk of a return.

No circumstance has contributed more to improve that department of surgery which regards the treatment of cataract, than the knowledge of the solvent power of the aqueous humour; since it not only enables us to impart sight to the blind during the tender years of infancy, when extraction is wholly inapplicable, and depression cannot be accomplished owing to the texture of the cataract, but also to remove the cataract in adults and old persons with greater ease and safety to the patients. Though this quality of the aqueous humour, as already observed, was known before the time of the late Mr. Saunders, yet to him unquestionably belongs the merit of having been the first to extend and apply this principle to the removal not only of congenital, but of every other species of cataract. Before him no surgeon appears to have made congenital cataract the particular subject of their attention, or conceived the idea that it might be removed by means different from those commonly employed in adults. Hence, then, as the great mobility of the eye, the smallness and want of consistence in the parts to be operated upon, and the untractableness of children, rendered the two operations in general use wholly inadmissible at an early age,—the little sufferers were uniformly consigned to blindness, during the first ten or twelve years of their existence. Besides the delay in education thus occasioned, the advantages of an early operation must be apparent, especially in those cases where the blindness is complete; since otherwise the retina, for want of due exercise, becomes unsusceptible to its appropriate stimulus, and the rolling motion of the eye is so much confirmed by habit, that in some cases it never can be wholly corrected, and it always continues for a long time independent of the will, even after the opacity has been removed. The exposure of the opaque crystalline to the action of the aqueous humour, by freely lacerating the capsule and loosening the texture, or entirely cutting to pieces the lens, is now generally acknowledged to be the only operation applicable to the condition of infancy: but in adults, many practitioners of eminence still contend for the superior advantages of extraction, or depression; while others, like Mr. Gibson, partly taking advantage of the solvent power of the aqueous humour, have recourse to a method compounded of both. Were we ignorant of the powerful hold which habit has even on the most enlightened minds, it would create surprise that any one should be found to contend for operations exceedingly difficult to be performed, and in which parts essential to vision may be irreparably injured, or the eye itself entirely destroyed by the most expert operator, in preference to one easy of execution, almost uniformly successful, which appears pointed out by nature, and where she herself so materially aids the cure. When this operation becomes better known, I however flatter myself, that every remaining objection must give way to its superior merit.

The long delay attending Mr. Saunders's promised communication to the Public, tended unquestionably to retard this desirable event. So little indeed was the operation known, that in June 1810, when I invited Mr. Ware with several other professional gentlemen to witness one of my modes of operating, in the case of Mr. Purkis of Chancery-lane, (vide Case 27), he candidly acknowledged to the gentlemen present, and after I left London, to the patient and his friends, whom he frequently visited, to observe the after-treatment and the progress of the cure, that he had never practised or previously seen a similar operation.

On this occasion, Mr. Ware did me the honour to express himself much pleased ; and I observe, that both he and his Son have since successfully operated in a similar manner on a considerable number of infants and young persons. Nevertheless, he still continues to prefer the operation of extraction, and to express a decided preference of it, when the disease attacks adults or aged persons.* He acknowledges, that any dread of injuring the iris is now done away, by the well-known property of the belladonna; but still he considers the slow progress of amendment, and the necessity which often occurs of frequently repeating the operation, to be objections to its indiscriminate use, which have not yet been wholly overcome in his mind.† The uncommon density of the capsule, in the case of Mr. Purkis, doubtless rendered repeated operations necessary; but, in general, since I have adopted my present mode of proceeding, I find one operation sufficient in young persons; and even in cases of solid cataract in old age, I have seldom had occasion to operate more than twice.

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* It will be seen, in a subsequent part of this Work, that the operation Mr. Ware saw me perform was not the one which I usually pursue in the cure of the hard and solid cataracts of old people; and it may be presumed that his opinions would have more nearly coincided with mine, if he had been better acquainted with the whole of my practice.

† "Observations on Cataract, &c. &c. by James Ware, F.R.S. &c." edition of 1811, p. 367. If I may be permitted, however, to judge from a single instance, the remaining prejudices of this eminent oculist have been since removed: as I have recently been consulted by a gentleman nearly thirty years of age, on one of whose eyes he has successfully performed this operation in a case of solid cataract.

Mr. Gibson states, in a recent publication on artificial pupil, that he has been in the habit of breaking down the lens in infants for the last ten years; but, like Mr. Ware, he observes that when the extraction of a cataract can be performed with facility, he prefers that operation. Where, however, that is inapplicable, he recommends depressing the cataract, when it is sufficiently hard, or extracting it when soft, after having previously ruptured the capsule, and reduced it to a pulpy state. With the view of effecting this latter purpose, he makes an opening with the cornea knife towards the outer angle of the eye, at the usual distance from the sclerotic coat. If there exist any doubt of the free laceration of the anterior part of the capsule, he carries the point of the knife obliquely through the pupil, so as to make a more free division of it. All pressure upon the eye-ball being now discontinued, the curvette is next introduced through the incision in the cornea, and the whole of the pulpy cataract removed by degrees. This removal, he adds, is much facilitated by a gentle pressure with the convex parts of the instrument towards the vitreous humour. From a very extensive experience in soft cataracts in adults, and in children who had them from their birth, I however may venture to assert, that this operation is perfectly unnecessary; since, when the cataract is sufficiently soft to allow the needle to pass through its nucleus, it may, when broken in pieces, be either partially or altogether pushed with perfect safety into the anterior chamber, where it will in three or four weeks, and frequently in a shorter time, be absorbed. I have seen even a solid cataract, in a patient nearly forty years of age, after its central part had been divided, though it remained apparently unchanged for a fortnight, in a few days after become flocculent, and in less than a month from the operation wholly disappear. There seem to me other objections to Mr. Gibson's operation of opening the cornea, either for extracting the soft cataract, or an adherent capsule. In congenital cataract, where this operation will be found most frequently applicable, the action of the muscles of the eye being for the most part involuntary, render any operation impracticable without the aid of a speculum, which, as in the case of Miss Russell,* will be often found irreparably to derange the form of the pupil.

The introduction of the hook or iris scissars to extract or cut the adherent capsule without wounding either the cornea or the iris, or occasioning a loss of the vitreous humour, requires a degree of steadiness in the patient and dexterity in the operator, both of which are seldom to be met with.

There are two kinds of case, however, in which this operation of Mr. Gibson's will prove useful, provided the patient possesses a sufficient degree of self-command to keep the eye steady without the aid of a speculum. The first is, where a portion of the capsule is wholly detached from the ciliary processes, and floats about in the vitreous humour in the axis of vision.† The second, where the lens has fallen into the anterior chamber, unbroken; in which case, as will be hereafter stated, the nucleus will produce constant irritation in the eye.‡ (Vide Case 30.)

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* Vide Case 21.

† Vide Case 35.

‡ Although some opacity may ensue from the puncture of the cornea, it is not here so much to be dreaded as in cases of closed pupil, the natural pupil being so remote from the punctured part, that the patient's vision will not be injured.

The preceding objections may be applied, with equal if not greater force, against the methods recommended by Richter, Wenzel, Ware, and others, for the removal of capsular cataract. In the second edition of Mr. Ware's works, published in 1805, he advises "the cornea to be divided in the same manner as if the opaque crystalline alone was to be extracted, to the extent of about nine-sixteenths of the circumference of this tunic. He then introduces a fine-pointed instrument, somewhat smaller in size than a round couching needle, and a little bent towards the point, under the flap of the cornea, with its bent part upwards, until its point be parallel with the aperture of the pupil; the point should then be turned toward the opaque capsule, which is to be punctured by it, in a circular direction, as near to the rim of the pupil as the instrument can be applied without hurting the iris. Sometimes the part included within the punctures may be extracted on the point of the puncturing instrument; but if this cannot be done, it should be taken away by means of a small forceps."—Now it must be evident that the danger here is greatly increased by the repeated introduction of forceps and similar instruments to remove the capsule, inasmuch as by its close connexion with the tunica arachnoidea, this latter membrane must unavoidably be ruptured, and occasion an extravasation of the vitreous humour, by which means the pupil generally becomes either partially or wholly obliterated, or the eye irrecoverably lost from inflammation.

Mr. Ware himself seems fully sensible of this danger, since, in a note in his translation of Baron De Wenzel, page 250, he observes that "the posterior part of the capsule of the crystalline, lies in such close contact with the membrane that covers the vitreous humour, that he believes it to be utterly impossible to disengage and extract the former, without at the same time involving the latter."

It is unnecessary to enter into a detail of the methods recommended by other writers for the removal of the different kinds of capsular cataract, since they appear not to differ materially from those already specified, and are all liable to the same objections.

Before I enter into a description of my operation for this, and every other species of cataract, I shall make a few remarks on the forms of the different instruments used by the most eminent surgeons, who practise the operation of couching; and, after pointing out the objections to which they are liable, I shall describe those which I have had constructed, and now use, as they in every respect fully answer the purposes for which they were intended.

SECTION II.

A DESCRIPTION OF INSTRUMENTS—OF THE OPERATIONS FOR THE DIFFERENT SPECIES OF CATARACT—AND OF THE AFTER-TREATMENT.

Though a skilful operator may, doubtless, by his superior manual dexterity supply many deficiencies in the form of his instruments, yet I conceive it to be incumbent on every surgeon, after he has determined on the mode of an operation, to consider attentively whether the form of the instrument generally used is well calculated to accomplish his object, or if it be capable of further improvement. This observation, though applicable to every operation which falls within the province of surgery, applies more especially to those intended to remedy the diseases of an organ of such extreme delicacy as the eye.

The employment of the broad spear-pointed couching needle was productive of so great a degree of inflammation, as often to destroy the eye itself. Mr. Hey, of Leeds, was, I believe, the first English author who, in order to obviate this objection, recommended a smaller-sized needle; but the instrument sold in the shops under the name of this eminent surgeon, is in many respects ill adapted to answer the purpose for which it is intended. From its rounded point and wedge-like form, a considerable degree of force is requisite to introduce it through the coats of the eye, and afterwards to conduct it towards the cataract. This compels the operator, if he uses Pellier's speculum, to employ a degree of counter-resistance which is very painful to the patient, and frequently conduces to subsequent inflammation; while, on the other hand, should the speculum be omitted, it will be difficult to keep the eye sufficiently steady to accomplish the object he has in view. If the cataract is to be divided, this instrument, from cutting only at its point, and quickly becoming blunted, will not readily pass through the substance of the lens (unless it be very soft), and in consequence of repeated and unsuccessful efforts, the capsule will very probably become wholly detached from its ciliary connexion, or the lens will be made to press unequally against the iris—in either case, no resource is left but to depress it. The curved-pointed needle of Professor

Scarpa is well calculated to accomplish his method of depressing the cataract; but it is still less adapted than Mr. Hey's, for dividing the opaque lens. Mr. Saunders, while I was his pupil, latterly used a needle about the size of Mr. Hey's, flattened somewhat further towards the handle, having a spear point, which had a sharp edge, only as far as the shoulder. With this needle I at first operated, but soon found it ill adapted to accomplish my mode of conducting the operation; I therefore laid it aside, and tried the one-edged needle, which Mr. Ware now recommends to be used in operating for congenital cataract. This, however, did not long answer my expectations.

The blade of that which I now employ is eight-tenths of an inch long, the third part of a line in width, nearly flat, having a slight degree of convexity through its whole extent. It is spear-pointed, with both the edges made as sharp as possible, to the extent of four-tenths of an inch. Beyond the cutting edges it gradually thickens, so as to prevent any discharge of the aqueous or vitreous humours: the handle is of the usual length.* The effect of this instrument is easily understood; it enters the coats of the eye with the most perfect freedom, traverses the posterior chamber without in the least degree displacing the cataract, and cuts it in pieces with great ease, where it is not very hard. Instead of the cutting edge being confined to the mere point, it extends so far back, as to be nearly, if not entirely, equal to the diameter of the cataract; by which, in children and adults, I am frequently enabled, at the first operation, to cut in pieces both the capsule and opaque lens. Its convexity also affords a sufficient degree of strength to prevent it from bending during its passage through the coats of the eye, should they present any considerable resistance; but it cuts so very sharp, that this in general is not to be feared. Some caution, in its use, however, is requisite on the part of the operator; otherwise, as it is an instrument of great power, and traverses the eye with so much facility, it may wound the iris, or its point may be carried too far towards the nose. The curved needle which I prefer for capsular cataract, is much less bent at its point than that recommended by Scarpa, on which account the operator can direct its point with greater ease and precision, for the purpose of separating minute portions of capsule, when adherent to the iris.*

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* Vide Plate III. Fig. 4 and 5.

The knife I use for hard cataracts in old people, is the same as that described for making artificial pupil, only of a smaller size.† The superior sharpness of its edge enables me to cut the hardest cataract, and effectually to remove the anterior part of the capsule, however much thickened it may be. This I could not do with the two-edged needle; and in my attempts to accomplish it with that instrument, the capsule has sometimes become either wholly, or in part, separated from its ciliary attachment, when the cataract floated in the vitreous humour, or unequally pressed against the posterior part of the iris, thereby producing considerable pain and inflammation. The speculum of Pellier is, I believe, very generally used in this operation; but the patient often complains more of the pain caused by it, than by the needle. This appeared to me to arise, from the segments of two spherical bodies nearly of the same magnitude being in contact, by which all pressure is confined to a single point. Sufficient controul over the action of the muscles of the eye-ball, can therefore only be obtained by using a degree of compression which gives great pain during the operation, and sometimes produces a contusion of the coats of the eye, which I have seen excite and keep up considerable inflammation for some time. It is therefore evident, Pellier's speculum is not well adapted for the intended purpose. The principle which ought to be kept in view in the construction of an instrument for fixing the eye, where the needle is used, is to divide the necessary pressure on as large a surface as possible, instead of confining it to a single point. To effect this, the bearing part of the speculum should be concave, and accurately adjusted to the convexity of the eye-ball, whereby the assistant or operator has much more command over it, and the ill consequences I have just mentioned are avoided. When a student at St. Thomas's Hospital, about six years since, I caused an instrument of the above description to be made of silver wire, similar to that employed in the construction of Pellier's speculum; but it failed to answer the intended purpose, as the curvature was irregular, and did not correspond with the convexity of the eye; its angles were besides so obtuse, as to prevent it from being easily inserted underneath the lid. Disappointed in my expectations, I have since had another made of solid metal, which possesses the advantage of a perfectly smooth and regular surface. The bearing part is so formed as to make an equal pressure, on somewhat less than one third of the circular outline of the eye-ball; but as this varies in different patients, the operator should always be provided with two or three instruments of different sizes.*

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* Vide Plate III. Fig. 3.

† Vide Plate III. Fig. 1 and 2.

Operation for Solid Cataract in Children and Adults.

In the earlier periods of my practice, I performed one operation and used one instrument; but experience soon taught me that the degrees of hardness, as well as the different species of cataract, vary so considerably, that it was necessary to use different instruments, and adopt different modes of operating. The various operations I am now about to describe, are equally as applicable to persons in middle age, or in advanced life, as to children or young persons, provided the cataracts are of the same consistency and species. I shall begin with the operation for a solid cataract, or when the disease consists of opaque capsule, and some remaining portions of unabsorbed lens, which frequently occurs in congenital cases.

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* Vide Plate III. Fig. 6. 7.

The pupil being in a dilated state from the application of the extract, or a strong solution, of the belladonna within the eye-lids, about an hour previous to the operation, the patient, when the right eye is to be operated on, must be placed on his back, on a table, with his head raised on a pillow, and the light falling on the eye, over the nose. The operator sits behind, holding the speculum in his left hand. On the contrary, when the left eye is to be subjected to the operation, the patient must be placed on a chair of a convenient height, while the operator sits before him, and the speculum is held by an assistant, who stands behind and supports the head. This description applies to adults; but if a child is the subject of operation, three assistants will be necessary; one to secure the head, another the feet and knees, and a third to make pressure on the chest, and also to pull down the lower eye-lid. If the right eye is to be operated on, the little patient should be laid on the table, and secured as has been just described: but when the left eye is the subject of surgical treatment, if too young to sit up in a chair, he should be laid on a narrow table, his legs hanging over its edge, and his head held on a pillow by an assistant. The surgeon sits before him, and fixing the eye with the speculum in his left hand, he has in this case also the great advantage of operating with his right, while he is enabled in both to direct the eyeball as he pleases. This variation of position appears to me highly advantageous; as few, if any, can possess the power of using both hands with equal dexterity.

Having secured the eye by a gentle pressure with the concave speculum, introduced under the upper eye-lid, I enter the two-edged needle through the sclerotic coat, about a line behind the iris, with the flat surface parallel to that membrane. I then carry it cautiously through the posterior chamber, without in the slightest degree interfering with the cataract or its capsule, till the point reaches the temporal margin of the pupil; when I direct it into the anterior chamber, and carry it on to the nasal margin of the pupil, in the line of the transverse diameter of the crystalline lens. I then turn the edge backwards, and with one stroke of the instrument cut both capsule and cataract in halves. By repeated cuts in different directions I afterwards divide the opaque lens and its capsule in many pieces, and at the same time take particular care to detach as much of the latter as possible from its ciliary connexion. As soon as this is accomplished I turn the instrument in the same direction as when it entered the eye, and with its flat surface bring forward as many of the fragments as is in my power, into the anterior chamber, by which means I frequently leave the upper part of the pupil perfectly free of opacity.* By cutting in pieces the capsule and lens at the same time, not only is capsular cataract generally prevented, but the capsule is also much more easily divided into minute portions, than when its contents have been previously removed. The central division of the capsule and cataract prevents the liability of their becoming too soon detached from the ciliary processes, and revolving on the needle, or slipping undivided into the anterior chamber. In cases of large and solid cataract, this is very essential to the perfect execution of the operation, as the natural connexion of the capsule with the ciliary processes assists, in conjunction with the vitreous humour, to afford a sufficient counter-resistance to admit of its nucleus being completely divided, which, were that connexion detached, could not be effected but by repeated operations. This plan is of peculiar advantage in those cases of cataract termed *elastic,* where, from the great thickening of the capsule, it is almost impossible by any of the usual operations at once to make an opening sufficiently large to admit the escape of its contents; as, by the degree of pressure downwards, necessary to effect this, the opaque body becomes depressed below the axis of vision, but the moment the pressure of the instrument is withdrawn, it again rises to its natural situation, as if touched by a spring.* In all cases when the fragments of the opaque crystalline are placed in the anterior chamber, their solution and absorption are much more rapid, and less irritation is produced than when they are suffered to remain behind the iris; which was Mr. Saunders's practice, before he adopted the anterior operation of Conradi, and the one I myself formerly pursued.

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* Vide Case 32.

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* Vide Case 27.

When the anterior chamber is large, I now generally push the whole of the divided cataract through the pupil at the first operation, in which situation it becomes dissolved in about a month or five weeks; and an extensive experience has convinced me that this practice will be always attended with success, when the cataract admits of its nucleus being cut in pieces.*

Operation for Fluid Cataract.

The instrument, and the primary steps of the operation for the cure of fluid cataract, are precisely the same as those for solid cataract; but, after carrying on the point of the needle to the nasal edge of the pupil, and making the transverse division of the capsule, the instrument should be then withdrawn about half a line, and the capsule, which is generally opaque, should be cut in pieces, and separated as much as possible from its attachment to the ciliary processes. The reason I partly withdraw the needle, is to avoid wounding the pupillary edge of the iris while cutting the capsule in pieces; the opaque fluid which immediately escapes into the anterior chamber on the division of that membrane, rendering the aqueous humour so turbid, as to prevent the point of the instrument from being seen. One operation is generally sufficient to clear the whole ambit of the pupil from opacity; but it sometimes happens, particularly with children, that the patient becomes so restless as not to allow the operation to proceed to the full extent. It will then be necessary, by a second operation at a future period, to remove the remainder of the opaque membrane.* When merely a small aperture is made in the capsule, its fluid contents will become mixed with the aqueous humour and be quickly absorbed. The case is then simply capsular cataract, and will require one of the operations about to be described for the cure of that species of the disease; as the capsule, very rarely dissolves, if suffered entirely to retain its natural attachment.

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* Vide Case 41 and 42.

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* Vide Cases 22 and 24.

Operation for Capsular Cataract.

In cases of capsular cataract I prefer the curved-pointed needle already described, which should be introduced through the sclerotic coat at the usual distance behind the iris, with its convex surface forward, and consequently the point directed towards the bottom of the eye. Having passed it carefully through the posterior chamber to the temporal margin of the pupil, (previously dilated by the application of belladonna), I bring it forward into the anterior chamber, and carry it as near to the nasal ciliary attachment of the capsule as I can without a risk of injuring the edge of the pupil. The capsule should then be freely lacerated, and detached as much as possible round its circumference from the zona ciliaris, when the pieces will soon disappear, provided the capsule is not very much diseased.* Should this, however, be so preternaturally dense as to prevent its free laceration, the needle, after it is brought nearly to the nasal edge of the pupil, as already described, should be carried in the arc of a circle from the internal to the external angle of the eye, by which the thickened capsule will be completely separated from its ciliary connexion, except a small part near the external canthus; or the instrument should be directed from above downwards, by which a similar attachment will be preserved at the lower part of the zona ciliaris. In the former case, I allow the capsule to remain on one side of the iris; in the latter, I push it below the pupil. In either situation it gradually contracts into so small a compass, that it cannot impede the passage of the rays of light even when the pupil is in its most dilated state; while it is prevented from floating in the vitreous humour by the small remaining attachment to the zona ciliaris. The separation of this attachment must therefore be studiously avoided, as by it the capsule remains fixed; and should it even continue undissolved, the pupil cannot be again obstructed.*

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* Vide Case 29.

Operation for Adherent Capsular Cataract.

If the capsule should adhere to the posterior part of the iris, in part, or through its whole extent, the same steps should be pursued as where no such adhesions exist, taking care however not to use much force with the instrument; as, should the attachment be very firm, the iris might otherwise be in part torn from the ciliary ligament. By gentle repeated efforts the desired object may be safely accomplished; and I have repeatedly seen the radiated fibres contract, as soon as the adherent membrane was liberated, when the pupil has been immediately restored to its natural size and functions.†

The free laceration or detachment of the capsule from the ciliary zone through the whole extent of its circumference (excepting the small part to prevent its floating), I consider of the utmost importance; for where any considerable portion of the opaque capsule is suffered to remain behind the iris undetached, the sphere of vision must at all times be very much limited, and in a faint light, or during the night, the dilatation of the pupil can be of no use whatever, the opaque membrane totally impeding the passage of light. The effect of a small aperture in the centre of the capsule, must be nearly the same as that of a fixed contracted pupil. The patient is enabled by day to see objects directly before him, but at night enjoys very imperfect vision, and even by day, the lateral rays of light cannot enter sufficiently for him to see sideways.* I am supported in this practice of freely lacerating the capsule, by the opinions of Professor Scarpa,† who lays great stress on "lacerating the capsule, as much as possible in every part of its circumference, so as to clear the whole ambit of the pupil." He, however, adds, that he afterwards pushes it with the point of the needle into the anterior chamber of the aqueous humour. To this last step of the operation I have strong objections, unless it be first broken into pieces; since it is highly probable, when the capsule is preternaturally dense, that it may remain a long time undissolved, and occasionally produce inflammation by its mechanical friction against the iris.* I have myself known it continue unabsorbed for more than two years after being placed in the anterior chamber without division.† I think it necessary, however, distinctly to state that it is only in capsular cataract, (unless when the vitreous humour is diseased,) that I conceive it expedient to put the opaque body out of the axis of vision; as in all cases of lenticular cataract, where the vitreous humour was sound, I have seen it, when depressed, at some period return to its original situation.‡

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* Vide Case 28.

† Case 30.

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* Vide Cases 10, 38.

† Vide his Practical Observations on Diseases of the Eye, page 385.

Several instances have however occurred to me where, from the unexpected fluidity of that humour, the cataract with its capsule had no sooner been cut in pieces, than the fragments have spontaneously disappeared, and the pupil become instantly clear.* Where this happens, no danger of the lens again returning is to be apprehended, its specific gravity being greater than that of the disorganized vitreous humour; and having been freely broken in pieces, it no doubt soon dissolves. This state of the eye is mentioned by most of the eminent authors who have written on cataract; and it is obviously one in which extraction must always fail, as, the capsule of the vitreous humour being disorganized, the whole contents of the eye-ball will escape through the section of the cornea, when the eye is irrecoverably lost.

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* Vide Case 31. † Vide Cases 5, 25.

‡ Richter mentions a case where it returned two years after it had been depressed.

Operation for Solid Cataract in Old Persons.

In old-age, when the nucleus of the lens is frequently so dense and hard that the needle cannot be passed directly through its centre; with a knife of the same form as that used for artificial pupil, but somewhat smaller in size, I slice off, by repeated cuts, as much as I can of the opaque crystalline and its capsule, taking care not to dislocate the former body, nor to separate the latter from the ciliary processes. The fragments being then placed in the anterior chamber, leaves a space between the remaining anterior part of the cataract and the posterior part of the iris, which becomes occupied by aqueous humour. This not only acts on, and softens the remainder of the solid lens, but also materially tends to prevent it from pressing against the iris so as to excite inflammation, which, from being deprived of the support of the anterior part of the capsule, it would be otherwise likely to do. If the nucleus of the cataract be not very hard, nor of an unusually large size, when the portions placed in the anterior chamber are absorbed, it may then by a second operation be wholly cut in pieces, and brought forward for the purpose of effecting a more speedy absorption.* Should the surgeon, however, on trial find, from its size and solidity, that he is unable to accomplish this, he should again slice off as much as is in his power of the softened cataract, and in a similar manner place the fragments in the anterior chamber; when there is no doubt that, by a third operation, the nucleus will admit of being cut in pieces, and placed in the anterior chamber, where it will soon be absorbed. A long time must not be permitted to elapse between the operations, as the circumference of the lens being much softer than the centre, it will first become dissolved; when the nucleus, from its diminished size, may slip undivided into the anterior chamber, where by its mechanical friction against the iris it will keep up a distressing degree of pain and irritation in the eye. This ought therefore to be avoided, by repeating the operations in a proper time. If, however, this accident should occur, I would recommend that a small puncture be made in the cornea, for the purpose of extracting it; for although in most instances it would ultimately become dissolved without producing any ill consequences to the organ, yet by thus removing it, the patient will be saved a great deal of anxiety and suffering.

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* Vide Case 34.

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* Vide Case 40.

Operation for Adherent Lenticular Cataract.

Adherent cataract is distinguished by an irregularity in the form, and a greater or smaller diminution in the size of the pupil. From the firm adhesions which exist between the iris and the capsule of the lens, the pupil is fixed; its expansive power being entirely lost, even after the application of the belladonna. In cases where the contraction is great, it will not be sufficient to remove the opaque lens and its capsule, but the fibres of the iris must be divided in the manner described in the Chapter on contracted or obliterated pupil, otherwise, vision will be imperfect and its extent much limited. Should the adhesions be formed before the pupil is much contracted, the whole of the anterior part of the opaque capsule and lens must be cut in pieces and pushed into the anterior chamber, with the small one-edged knife, introduced at a proper distance behind the iris. The extent of the pupil being limited, the surgeon should be very cautious not to wound this membrane with the point of the knife. It will be better to repeat the operation two or three times, than to risk injuring or detaching any part of the iris from the ciliary ligament, which might be the consequence were any violent efforts made at once to perfect the operation.

Operation for Capsular Opacity with a transparent lens.

From syphilitic inflammation, and from other causes, the capsule frequently becomes opaque, thereby producing partial or total blindness, while the crystalline lens continues perfectly transparent and free from disease. The opacity may be confined either to the anterior or to the posterior part of the capsule ; or it may extend to both. When the opacity is in the anterior part of the membrane (which it usually is in cases of syphilis), it is easily discernible ; and it generally exists with an adhesion to the iris ; but if the posterior part alone of the capsule is the seat of disease, it is with more difficulty ascertained, and it will often require a strong light to fall on the eye, after the pupil has been previously dilated by the belladonna, before its exact situation and extent can be seen. The attendant symptoms are similar to those usually observed in cataract. The pupil possesses its natural sensibility to light, and the patient can distinguish colours and the outlines of objects. The operation is to be performed with the double-edged needle, in the manner described for solid cataract in children and adults. As the lens is in a healthy state, there will be no difficulty in dividing its nucleus and capsule; after which, without any danger of exciting inflammation, the whole may be placed in the anterior chamber if it is sufficiently large to contain them. I am induced thus particularly to point out the latter species of the disease, because, as far as I have been able to learn, it has not been specifically noticed by any writer on the subject of cataract; and I have recently seen several instances, where it had been pronounced amaurosis by many of the most experienced Oculists.*

After-Treatment.

After the operation has been performed, if pain and inflammation, with increased action of the arterial system, supervene, blood should be copiously, and if necessary, repeatedly abstracted, from the arm, until the pulse be considerably reduced. Should redness of the adnata, together with uneasiness and intolerance of light, still continue, leeches must be applied to the eye-lids, within the circle of the orbit, and on the side of the nose, over the part where the external nasal artery, anastomoses with the ophthalmic.

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* Vide Case 43. and page 251.

When the leeches are thus applied, there is a much larger quantity of blood abstracted, than when they are placed on the temple, or any other part equally distant from the eye ; it also issues from vessels connected with those under inflammatory action, and comes so immediately from the ophthalmic artery which supplies the internal parts of the eye-ball with blood, that I have seen the most striking benefit result from the practice. The dread of increased inflammation extending from the lids to the eye-ball, has deterred many surgeons from availing themselves of the great advantage which may thus be obtained. During twelve years that I have been in the constant habit of applying leeches myself, or ordering them to be thus applied, in no one instance has it been attended with any injurious consequence. A tumefaction of the eye-lid and cheek, and an extravasation of blood in the cellular membrane, have sometimes occurred ; but a lotion, composed of brandy, vinegar, and water, has quickly removed both. Sometimes the temporal artery is of a very large size, and seems by its quick and full pulsation, to convey an unusual quantity of blood: in this case, after puncturing it immediately above the zygomatic arch, and abstracting as much blood as is necessary, I take it up with a tenaculum, and completely divide it.

I have found it much more useful to divide the trunk of the artery than either of its branches, between which there is a very free anastomosis; and I have often seen an inflammation of the eye immediately stopped, after every other means had been tried without effect, when this large channel has been cut off, even though no blood has been suffered to escape. The division of the artery produces no ill consequence, as other vessels afterwards become enlarged, and supply those parts with blood where its branches were distributed: this, however, cannot immediately take place, and during the interim the inflammation is cured.. Blisters applied behind the ears, or to the nape of the neck, when there is not much inflammatory action, are generally useful. If applied to the temples during acute inflammation, they are injurious; as, from the irritation they excite, the determination of blood to the temporal arteries is augmented, and the vessels of the eye become, in consequence, still more overcharged. After the pulse has been reduced by general blood-letting, the action of the heart and arteries should be kept down by the tinctura digitalis, administered in doses of ten or twelve drops every two hours, until nausea be produced: the bowels must be kept freely open. Warm and emollient applications to the eyes afford, at the first, most relief: but I always discontinue them as soon as the patient is relieved from uneasiness; and substitute in their place, refrigerents; because if they are used too long, they induce chronic inflammation in the vessels of the conjunctiva.*

No warm application is of so much use to the eye during acute inflammation, as holding it frequently, with the lids open, over the vapour of boiling water in which has been mixed a small quantity of tincture of opium. This not only relieves pain by its sedative power, when thus brought in contact with the inflamed conjunctiva, but in several instances it has actually exerted its narcotic quality, and produced sleep. I have tried the steam of water without impregnating it with opium; but although it has afforded some relief, yet it was by no means equal to that experienced when the opium was added. A cataplasm, composed of linseed powder, should be applied immediately, as warm as the patient can bear it, every time the eye has been thus steamed.

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* It has been for some time a fashion to apply hot water to the eye, in cases of chronic inflammation of the eye-ball or lids, whenever the patient feels uneasiness in either. This practice cannot be too strongly reprobated; as though certainly grateful during the immediate application, still as it increases the relaxation of the conjunctiva, and the debility of its vessels, the disease is thereby augmented, and the necessity of the application rendered more frequent.

In nervous and dyspeptic patients, particular attention must be paid to the due regulation of the bowels; exercise ought also to be enjoined, which, with tonics, a generous diet, and country air, will in such cases be found much more beneficial than a rigid adherence to an antiphlogistic regimen. After the operation for solid cataract has been performed, the pupil should be kept dilated by the daily application of the extractum belladonnæ, by which the danger of its becoming contracted is in a great measure prevented.

Where the cataracts are fluid, a considerable degree of dilatation of the pupil frequently succeeds the operation, and it sometimes continues fixed and enlarged for several weeks: in such cases, the belladonna is obviously not required. This morbid enlargement of the pupil decreases spontaneously, and the iris recovers its natural tone. It is almost superfluous to add, that the patient's eyes should, after the operation, in every instance, be defended from too much light; but the length of time necessary to continue this practice, depending on the presence of inflammation and other circumstances, must therefore be left to the judgment of the surgeon. When the operation for cataract has been performed on one eye, as long as there remains in it any degree of inflammation, the other, if not diseased, should be shaded; as, were light admitted, by the sympathy existing between both, the irritation in the eye operated on would be kept up and increased.

SECTION III.

General Observations.

In the description of the different operations for cataract, I have dwelt very particularly on the advantages derived from bringing forward into the anterior chamber, as much as possible of the lens and capsule after they have been freely divided. This practice is not to be confined to any one species of the disease, or to any age, from the infant under twelve months old, to persons who may have attained four-score years; it is equally applicable to all. In the writings of Pott, Scarpa, Hey, and others, the successful practice of placing fragments of the cataract in the anterior chamber is recorded; from an extensive experience I am very fully convinced of its superior efficacy; and still further, now, do not hesitate to bring the *whole* of the cataract forward after its nucleus has been divided, provided the anterior chamber is sufficiently large to admit of it. Any fears of injurious consequences resulting from either practice, must proceed from a want of sufficient experience.

The long-continued inflammation produced by the mechanical friction of an undivided lens during its absorption, when placed in the anterior chamber; or even when the texture of the lens has been freely divided, if the fragments are suffered to remain behind the iris; has no doubt contributed in a great measure to excite these apprehensions. The operation I recommended is obviously different from either of these, which certainly gave some ground for such apprehensions. The former I consider as a very unfortunate circumstance, the latter I now studiously avoid. Care must, however, be taken that the needle should pass immediately through the centre of the cataract, to avoid the ill consequences of merely dividing the edges, and leaving the nucleus entire. In some instances where this has happened, I have seen the cornea become ulcerated from the long-continued pressure of the solid nucleus on its internal surface. At the time I pursued the posterior operation of Mr. Saunders, which as already stated consisted of lacerating the anterior part of the capsule, and loosening the texture of the lens, without placing any part of it in the anterior chamber, I was frequently obliged to repeat it four or five times before I could entirely clear the pupil; on the contrary, in a large proportion of cases in young persons and adults, I now succeed at the first operation; and for the last eighteen months I have not had occasion, unless in one instance, to operate more than twice on patients of this description. I find the attendant inflammation to be much less than it was in that practice, as it is now a very rare occurrence for me to experience in children that degree, which requires general depletion; and even in adults, though the inflammation is commonly more acute, yet by attacking it early, there is no difficulty in removing it by the means recommended under the head of After-treatment. After the age of fifty, though the cataracts will often admit of being at once cut in pieces, yet this is not always practicable: as mentioned in the description of the operation for the hard cataracts of old people, it will at times be necessary to diminish its bulk, by cutting off some of its anterior part and pushing the fragments into the anterior chamber, before an attempt is made to divide the solid nucleus; its subsequent division is, however, more necessary in this, than in any other species of cataract. The lens in old people being frequently solid and of a large size, if suffered to remain in situ even after a large portion of its anterior surface has been cut off, will generally continue for six or eight months, and sometimes for a still longer period undissolved; its absorption will also be very slow even when placed in the anterior chamber, if its nucleus be not divided. To place in a strong light the advantages of treating the solid cataract of middle-aged and old people as I have recommended, I refer my readers to an attentive perusal of a few cases where this practice has been pursued, and some others that have been treated differently.*

It will be seen by the case of Taylor, (No. 36,) aged 72, that in the left eye, in which the nucleus was divided and placed in the anterior chamber, the whole of the cataract disappeared, without any bad symptom, in less than ten weeks; while in the right eye, where the lens was placed entire in the anterior chamber, it was nearly six months in dissolving, and great part of that time the patient suffered exceedingly from pain and inflammation.

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* Vide Cases 36——42.

Mr. V.—'s Case (37), by two operations had the greater part of the anterior portion of the cataract sliced off, and placed in the anterior chamber, where it became absorbed in as short a period as is usual: yet, nine months after the first operation, it was necessary to extract the solid nucleus, which remained undivided behind the iris. In the Case of Colonel B. (38), although the cataract denuded of its capsule had been exposed to the action of the aqueous humour nearly five months, and subsequently remained in the the anterior chamber for several weeks, yet the nucleus being undivided, it kept up a considerable degree of irritation, and in seven or eight months after the first operation required to be extracted. In Mrs. C.—'s Case (39), the cataract was of that favourable consistence which admitted of being at once very freely divided, and with so little pain that the operation was finished without her being sensible of its commencement; yet, as the fragments were not placed in the anterior chamber, they excited so much inflammation by their unequal pressure on the posterior part of the iris, that the destruction of the eye, or a closure of the pupil, was prevented only by the most active antiphlogistic plan. These unpleasant consequences are happily contrasted in the following cases—

Mrs. H. aged 40, (Case 42), in whom the cataract was of an unusually large size, and so hard that it could not be cut in pieces, but was merely divided in halves, and with the anterior part of the capsule placed in the anterior chamber, where they became absorbed in little more than five weeks. During this period it was only necessary once to apply a few leeches to the eye-lids.*—In Ann Shee, aged 64, (Case 40,) the nucleus of each cataract remained behind the iris, deprived of its capsule and anterior part for ten weeks, without apparently diminishing in size, when, being freely divided by a second operation and placed in the anterior chamber, each were in a fortnight almost completely dissolved, and the patient could then read the smallest print.—The Case of John Herbert, aged 40, (Case 42), will be found the most striking and instructive: in his left eye the cataract, which had existed for nine years, was divided into three or four parts, and the whole placed at once in the anterior chamber, where, without one unfavourable symptom in five weeks, it had entirely dissolved. In the other eye, one half of the cataract, being also placed in the anterior chamber, had disappeared in about six weeks; while the other half, which remained behind the iris, was not completely absorbed in thirteen or fourteen weeks, during the latter part of which time it kept up almost constant irritation and inflammation in the eye, requiring repeated blisters, purgatives, &c.

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* The posterior part of the capsule, which was opaque, remained in its situation undissolved; but, a small aperture in the centre enabled the patient to read the smallest print with facility, when placed immediately opposite to the eye. The sphere of vision being, however, very limited, I have determined to perform the operation for capsular cataract. The imperfect vision resulting from a small central aperture in the capsule, was equally manifested previous to the last operation, in Case 38.

The above cases clearly manifest that the quick solution of the lens, when thus divided and placed in the anterior chamber, prevents any considerable and continued inflammation: the necessity of repeated operations is also prevented.

It is certain that a considerable degree of danger exists often, if the lens is suffered to remain behind the iris after it has been freely divided; and if it be not divided, whether it remains behind the iris, or in the anterior chamber, it will be indissoluble for a very considerable time, and not unfrequently require extraction. The inflammation resulting from an undivided lens when placed in the anterior chamber, seems to arise more from long-continued friction, than from the pressure of a large lens, as is particularly shown in Case 36, where the patient's sufferings seemed much greater when the cataract in the right eye was reduced to the size of a flax-seed, than it was at first. In cases of the hardest cataract, and of the largest size, there is seldom any inflammation for the first three or four weeks after it has been placed undivided in the anterior chamber. During this period its circumference and external surface dissolve as speedily as can be wished; but, the solid nucleus alone remaining, the irritation then commences: the ill effects may, however, be avoided by the division, or entire removal of the solid central part of the lens through a puncture in the cornea. Although perfectly aware of these facts for a long time, yet, from the accident which occurred to Miss Russell, Case 21, it is only lately that I could prevail on myself in such cases to open the cornea, which I now find attended with the best consequences, and therefore strongly recommend the practice. It may be supposed by those who are unwilling to admit the full extent of the solvent power of the aqueous humour, that in Cases 37 and 38, the cataracts were of that kind which would not have become absorbed, even had the division so much insisted on been originally made. This opinion, if entertained, is shown to be erroneous, by Case 38, where after division I intentionally left a small part of the solid nucleus in the anterior chamber, and extracted the rest, and this part speedily dissolved, without producing any ill consequence. In another of my patients the same thing has recently occurred: the centre of the cataract was of a different colour and consistency from the exterior, which was readily acted on by the aqueous humour when placed in the anterior chamber; but the centre, which I had in vain endeavoured to divide, excited considerable inflammation, by irritating the iris after the soft parts had become dissolved; I therefore extracted it through a small puncture of the cornea; in doing this, it separated into parts; one of these, about one-eighth of the whole, escaped my notice, and remained in the anterior chamber, where it however became absorbed in a month after the operation, without one unpleasant symptom.

In congenital cataracts, the success of the different operations has been peculiarly striking; as in more than seventy cases of double cataracts of various sorts, and in patients of different ages, on whom I have operated according to modes which this Work recommends, I have not experienced a single failure; and the result has been entirely successful in all, excepting two eyes, when, by cold imprudently caught, and not from any failure in the operation, there came on subsequent inflammation, which terminated in a closure of the pupil. Relief, however, could still be administered by the operation for artificial pupil.*

If an attempt be made at once to cut into pieces an opaque lens, whose solidity forcibly resists the passage of the needle through it—the action of the instrument will cause a separation between the capsule and the zona ciliaris, when the cataract will be partially depressed in the vitreous humour—turn round and press with its posterior convexity against the iris, or it will pass through the pupil into the anterior chamber. All these accidents occurred in my early practice, until experience enabled me to judge, from appearances, what might be the species of cataract, and its degree of hardness. The same means made me acquainted with a further important fact, that in some species of cataract, when the density is equal, the disposition to solution is not always so. The slate-coloured congenital cataract is an example of this; for although it admits the passage of the needle through it with the greatest ease, yet it usually takes a much longer time to dissolve than any other cataract of equal or even greater solidity.* There is a considerable variation of time in the disappearance of the several species of cataract: the fluid is usually absorbed in a few days, I have often seen it become so in a few hours, and on one occasion in a very few seconds.* The membranous congenital cataracts of infants, which contain the grosser parts of the fluid lens, when placed in the anterior chamber, generally disappear in the course of a week or ten days. When the capsule is considerably thickened, as in adult congenital patients, the time required is considerably longer. The slate-coloured cataract with a transparent edge, is seldom removed under eight or ten weeks, unless the whole lens after division can be put into the anterior chamber at once, which in this species of the disease cannot often be accomplished. The lens, in persons in middle age, when treated as has been described, will generally dissolve in five or six weeks; but in old people, a longer time is requisite, as they frequently require a second operation.

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* One of these cases was that of a young man at Exeter, whose eye at the end of a week was entirely free from redness and inflammation, and the membranous cataract nearly gone. I then allowed him to leave his room with only a shade over the eye; when he imprudently sat for some hours in a current of air, which brought on inflammation. Having been professionally called to a distant part of the country, I did not see him till five days after this occurred; when, notwithstanding I pursued the most active measures, I could not for some weeks subdue the inflammation, during which period the pupil became closed. The other was a mendicant in Dublin, who would neither submit to the necessary after-treatment, nor remain within doors; and I saw him a short time after the operation, playing on the violin in the streets at midnight, with merely a handkerchief bound over his eyes. I was informed by a professional gentleman who has since seen and examined his eyes, that one is perfectly free from cataract, but the pupil in the other was closed.

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* Vide Cases 33 and 35.

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* This was in the case of a young lady nine years old, on whom I operated for fluid congenital cataracts in Edinburgh, in the presence of my friend, Mr. G. Bell, Senior Surgeon to the Edinburgh Infirmary, and of Mr. Russell, author of a New System of Surgery. Before I withdrew the needle from the right eye, the pupil was completely clear. During my attempts to detach the capsule, the milky fluid which issued from it immediately on its division, rendered the aqueous humour so turbid, as for a moment to obscure the iris. This gradually cleared; and after the operation was completed, although we all examined the eye very attentively, we could not discover the least vestige of the disease, unless a very minute portion of capsule towards the outer part of the pupil, the remainder being depressed out of the axis of vision. In the other eye the milk-like fluid disappeared as quickly; but some solid portions of lens passed into the anterior chamber, and remained some days undissolved.

In the posterior operation for the cure of cataract, the ciliary processes are necessarily wounded, which has been generally supposed one of the principal causes of inflammation; the opinion however is erroneous; as, after the operation for capsular cataract, I have scarcely ever witnessed subsequent inflammation.

The capsule of the vitreous humour is also wounded in the posterior operation; but the successful experience I have had in more than two hundred cases of cataract in my own practice, and the extensive field of observation I enjoyed while under Mr. Saunders's tuition, warrant me in the assertion, that this cannot be productive of any ill effect to the future vision of the patient. In the most successful operation of depression it always occurs, and also frequently during the operation of extraction; yet even in this latter case, unless some morbid change takes place in the eye from the consequent escape of the vitreous humour, vision will not be injured. But, what places the question beyond the reach of argument, is the fact, that where the vitreous humour is partially, or even wholly disorganized, as in Cases 5 and 7, the patients have seen nearly as well as if it had been in a sound state; and in Case 35, the vision was as perfect as it ever can be after the operation for cataract.

The natural form of the pupil, and its full powers of contraction and dilatation, are very generally preserved, when the operation is performed on those species of cataract which at once admit of free division. But in the hard cataract of persons advanced in years, should a division of the nucleus by a second operation be too long delayed, as the edge of the lens becomes first dissolved, if it does not slip through the pupil into the anterior chamber, its whole surface will press on the posterior part of the iris, and produce a permanent enlargement of the pupil. This enlargement has been of great advantage by increasing the sphere of vision, in some cases, where the natural pupil has been of a small size; and I have in no instance seen it attended with injurious consequences.

There are peculiar advantages which appear to me to belong to these operations; they are applicable to every species of the complaint, as well as to all ages, and they are capable of as great a degree of certainty as any other important operation in surgery.* It has been already shewn that there are several states of the eye, in advanced age, as well as during the earlier periods of infancy, where the operations of depression and extraction are wholly inapplicable. After depression, the lens has been known at the end of some years to return to its former situation; and during extraction, the escape of the vitreous humour has frequently produced a partial or total obliteration of the pupil; and sometimes even an entire destruction of the organ, several days after the operation was considered as successfully terminated. These are obstacles to ultimate success wholly independent of the skilful-ness of the operation.* The attendant danger of the absorbent practice arises from subsequent inflammation, which, however, by a careful after-treatment, will be almost in all cases under the controul of the surgeon. The power of repeating the operation without doing any mischief to the eye, is also another strong recommendation. In extraction, if the operation fail (at the first), the eye may be either totally destroyed, thereby causing great deformity ; or the protrusion of the iris is sometimes so considerable as to keep up great pain for two or three years, as in Case 29, when there is no chance of any benefit to vision by another operation, and the patient's sufferings can then only be relieved by destroying the organ altogether. Before I changed my practice, many operations were necessary to insure perfect success, and their frequent repetition was considered as a serious objection.

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* During my residence at Exeter, I operated in my public and private practice, on forty persons in succession, of different ages, suffering under cataract, without experiencing a single failure.

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* "Among the many causes which are apt to promote this prolapsus of the vitreous humour, may be reckoned violent terror. A peasant, from whom I had extracted the cataract, was so perfectly free from every bad symptom during the first four days after the operation, that there was but little doubt of a complete cure. A violent fire, however, unfortunately broke out in a house adjacent to the patient's, on the morning of the fifth day : the patient was much terrified and frightened by this accident, and soon after felt a most acute pain in his eye. Upon opening the eye, I discovered a prolapsus of the vitreous humour, which, if we can trust to the sensations of the patient, was not there before, and which was certainly occasioned by the fright; for he assured me that he had received no blow, nor any external injury on the eye."

Richter on the Extraction of the Cataract, page 106—7.

The pain attending my present modes of cutting the lens in pieces with sharp instruments, is however so very trifling, that I have often performed it without the patient's being sensible that I had done so; and they almost uniformly declare, that the previous application of the belladonna is more painful than the operation itself; while from the diminished bulk and softened state of the cataract, when a second operation is judged necessary, it is always much milder, and induces less inflammation than the first; and I am so little apprehensive of any attendant danger, that I have often performed it, at the request of my patients, merely for the purpose of expediting the cure two or three weeks.

Convex glasses are necessary after the removal of cataracts. A focus of two and a half inches for near, and four inches for distant objects, is generally found to answer well; but variations in their degree of refractive power must sometimes be made. Indeed, I have seen a few instances, as in Case 26, where the patients could see sufficiently well for all the common purposes of life, without the assistance of any kind of spectacles.

The advantages of an early operation in patients affected with congenital cataract, have already been slightly noticed. This is a subject of the highest importance; for those who have had the disease removed at an advanced age, are equally destitute of a knowledge of visual objects as the merest infant, while at the same time they are placed in circumstances far more unfavourable for its acquisition. The healthy infant examines every object with all the eagerness natural to its age; while the more aged congenital patient, from long-continued habit, has contracted a disinclination to the exercise of the eyes which he is seldom able entirely to overcome. The rolling motion of the eye depending on an involuntary action of the muscles, is therefore extremely difficult to be corrected, when the removal of the cataract has been long delayed, and it affords another obstacle to improvement in vision: this points out the necessity of an early operation. My own experience, as well as that of Mr. Saunders, and my late colleague Mr. C. T. Johnson, sufficiently demonstrate that it may be performed as soon after birth as the defect is discovered, with the most perfect ease and safety.* Were it practicable, I would not even suffer an infant's eyes to be exposed to the light till the cataracts were removed; by which means I conceive the involuntary action of the muscles of the eyeball might be in a great measure, if not wholly prevented. Most authors who have written on the subject of congenital cataract, mention the imperfect vision of patients for a longer or shorter period after the operation, and attribute it to an original deficiency of sensibility in the retina itself. None of them, however, appear to me to attach sufficient importance to the subject, except the late Mr. Saunders; whose opinions, as expressed in a letter written a short time before his death, correspond more exactly with mine, than any others I have seen.* It is evident, from the powerful obstacles to the acquisition of useful vision, that unless congenital cataracts are removed during the earliest periods of infancy, the progress in the knowledge of visual objects must be afterwards very slow and tedious. This is indeed sometimes so much the case, that I have known instances, where both the patient and his friends have despaired of ultimate success, and have altogether ceased to make the necessary efforts, even after the patient had begun to see objects with tolerable distinctness. It is by no means uncommon for the friends of a congenital patient to expect, that he should obtain the power of perfect vision immediately after the operation, and even to attribute their consequent disappointment to its imperfect execution. Parents ought therefore to be fully apprised of all these attendant circumstances of the complaint, and of the great necessity of a regular and constant attention to the future education of the patient; and they should not be discouraged because immediate success does not attend their most anxious efforts.

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* Mr. Saunders cured an infant of congenital cataracts, by the posterior operation, at two months old; Mr. C. T. Johnson performed the same operation with success at six; and I have been equally fortunate on a child of ten months old.

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* " To turn the faculty of sight to use, so as to display pre-
" cise notions of objects, demands experience, which can only
" be given by the exercise of vision with considerable attention
" for a long time. The operation has no power to confer actual
" knowledge of objects. It only prepares the eye for receiving,
" and afterwards the intellect must be employed on the objects
" so received, before any readiness can be acquired. The
" child therefore must be the object of his parents' attention,
" and be regularly and diligently exercised about large objects
" at first, and be taught to know them, then with smaller, and
" so on by degrees."

" *Vide Saunders's Posthumous Work*, p. 155—6."

From an early period of my attendance at the London Eye Infirmary, my mind has been deeply impressed with the conviction, that much more than is generally supposed necessary remained to be accomplished after the removal of the disease; and every day's experience confirms me in this opinion. Since an extensive practice has opened to me a wider field for observation, I have directed a considerable portion of my attention, to the development of the various causes which retard the patient's progress in acquiring a knowledge of visual objects, as well as to the best methods of training the eyes for its attainment, and I am convinced that if proper plans, which must vary according to the capacity and disposition of different patients, were systematically pursued, not only would useful vision be obtained by congenital patients in a much shorter period than usual, but it would fall little short of that enjoyed after the removal of the disease from persons not born blind. An intelligent person should always be appointed to superintend the management of those cured of congenital cataracts, whose sole business should be to watch and correct as much as possible those habits which impede the acquirement of vision, and to assist by every expedient which ingenuity can devise in the attainment of the desired object. To correct the rolling motion of the eyes, and to acquire the power of keeping them steady, the patient, after being fitted with spectacles, should be made to look steadfastly on one object. The muscles of the eye, and the organ itself, will soon become fatigued with this exercise; but it should be daily continued at proper intervals, by which the power of fixing the eyes at pleasure will rapidly increase. He should be made also to pick up small objects, such as grains of rice, &c.; this is also particularly useful, as it will in time enable him to judge accurately of distances, of which at first he is ignorant. Letters of a large size should be next cut out on pasteboard: as these are capable of being examined by the touch as well as sight, they will begin to afford him a knowledge of different forms and shapes. The propensity to indolence, and want of exertion in congenital patients, even in children, is often so great, that the preceptor will have considerable difficulty in making them apply daily for as long a time as is necessary ; and I have always found it regarded more as a task than a pleasure ; but this must not tempt him to any relaxation in the system.

The sensibility of the retina to the impression of light increases in proportion to the degree of exercise to which the eye is subjected. It is therefore obvious that the defect in its function arises from continued inaction, and can therefore only be cured by constant application. Those who possess the blessing of sight, are in the constant and almost momentary habit of exercising the retina, while in a congenital patient all its powers are suffered to lie dormant. Even in persons not born blind, who have successfully undergone the operation for cataract, if the disease had continued for many years, the functions of the retina during this period has been much impaired, and is afterwards materially improved by exercise. If this partial want of a natural sensibility in the retina be confined to one eye, which is often the case in the slate-coloured cataracts with transparent edges, the other eye should be covered, or the spectacle before it obscured, to prevent the passage of light, while the one affected is exercised as much as possible.

In the hope of establishing a systematic plan of educating persons who have been unfortunately affected with congenital cataracts, a young gentleman about 14 years old, on whom I successfully performed the operation, has been placed under the tuition of an able and ingenious master, who has been made acquainted with the different causes which appear to me to retard the acquirement of vision, and with the means judged necessary to be employed in his instruction. The progress this patient made while he was previously with his friends, by an attention to some of these rules, leads me very sanguinely to anticipate the greatest success from the present experiment. After his recovery from the operation he could merely distinguish colours, but was so entirely ignorant of the forms of objects that he could not perceive any difference between a square or a circle. To my great gratification, when he arrived in London nine months after the operation, he could read letters of a middle size, could help himself at table without assistance, walk alone in the streets,

&c. ; and I have great reason to hope that at some future period I shall be able to lay before the public the favourable result of my efforts, assisted by those of the intelligent master on this interesting subject.—On the contrary, I have frequently seen instances where the operation has been attended with equal success, yet, owing to a want of proper attention afterwards, the patient has derived little or no benefit from it. A young lady upwards of twenty years of age, one of the first persons I operated on at Exeter, to whom I was enabled myself to pay at first a good deal of attention, a month after she was cured, could distinguish the minute-marks on a watch-dial, and see a hair when plucked from her head ; but so great was her indolence, that it was only by constant watching, she could be urged to any kind of application ; and I have learnt that since her return home she has entirely given up every exertion for the improvement of her sight, and now remains nearly as helpless as ever.—The little attention which appears hitherto to have been paid to a subsequent education, in the constant exercise of the improving powers of vision, and the wish of impressing its importance still more strongly on the minds of those who are not sufficiently aware of the prevalence of the retarding causes, have induced me so considerably to extend these observations; and I feel a strong hope that, by the hints which they contain, they will materially assist the efforts of many anxious parents, in the future education of such of their children as have undergone the operation for congenital cataract.

Before I dismiss a subject with which the name of Mr. Saunders must ever be associated, I trust I shall be excused for introducing a public acknowledgment of the obligations I owe to my deceased friend and preceptor. To his disinterested liberality I am indebted for that general knowledge of diseases of the eye, which has led to the practice of the different operations recommended in this work. Besides the feelings of gratitude by which I am actuated, I have the additional motive of thus vindicating his character from the charges of secresy resulting from a want of liberality, which since his death have been brought against him; his conduct to me being in itself a refutation of these charges. He not only allowed me gratuitously to witness, and assist in, all his operations, as well private as public, for nearly a year and a half that I remained under his tuition, but he afterwards assisted me by every means in his power in the establishment of the West-of-England Infirmary for curing diseases of the Eye, and sanctioned the infant institution, by allowing his name to be placed in the list of its medical officers. With a view of still further promoting my professional advancement, he in the most friendly manner publicly announced in his Official Letter to the Governors of the London Eye Infirmary, the instructions he had given me, and the extensive field of improvement which had been opened to me by witnessing his practice, as will be seen by the following extract, taken from his letter in the 4th Annual Report of that Institution :

" This process for curing the cataract in children, " together with other observations relative to the eye, " which I am about to publish as soon as the necessary arrangements can be made, has already been " freely communicated to an individual, and the ample " scene of experience which this Infirmary affords, " opened to his view from a disinterested wish to " promote his professional object. Mr. Adams has " since settled in Exeter, and there established a " charity on the model of this institution. This

“ event I could not refrain from noticing, because it “ must excite in your minds, and the minds of the “ Governors, the grateful reflexion that your benevolence has given life and activity to an institution “ which has benefited society not only in its own “ operation, but by giving direct origin to an establishment producing its contingent of good in “ another part of the kingdom. That which was “ so liberally given in the spirit of private friendship, has been so long withheld from the public “ in the hope of making it more worthy of acceptance, and not through a mercenary motive, “ as some have malignantly observed, or an inclination to boast the possession of a secret.”

I had no claims on his generosity or friendship; our intimacy originated from having both served our apprenticeship to the same general practitioner, and in my having assisted in preparing his subjects for anatomical demonstration, during one of the years I attended the different classes at the united Hospitals of Guy's and St. Thomas's. The unreserved intercourse which subsisted between us for the period I enjoyed the peculiar advantage of being his pupil, and sole assistant at the London Infirmary for curing diseases of the Eye,* and the friendly correspondence we continued till within a fortnight of his death, enable me positively to assert, that his withholding from the public the long-promised communication of his operations for cataract and other diseases of the eye, proceeded neither from a want of candour nor any selfish motive of secresy. He announced his intention of publishing on these subjects, some time previous to my quitting the Infirmary; but he was prevented by various causes from fulfilling his intentions, and chiefly by the frequent attacks of the painful disease under which he so long suffered: this disease, to which he feelingly alluded in some of the last letters I received from him, at length deprived me of one of my best and most highly valued friends—the blind and diseased poor, of a zealous and humane benefactor—and the profession of a man eminently distinguished for his anatomical and pathological knowledge,—by which he was enabled to investigate and successfully to treat many diseases of the eye, which, before his time, were either wholly unknown or but very imperfectly understood.

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* Soon after I left London, two gentlemen were permitted by Mr. Saunders to attend the practice of the Infirmary for three months each, on condition (as I was informed by one of them, who came to Dublin from a distant part of Ireland, to see me operate,) that they were not to witness Mr. S.'s operations for cataract.

CASE XIX.

The beginning of September 1810, four daughters of a widow lady from Glasgow, of the name of Russell, came to me at Exeter; all of them were born blind of cataracts. On the three eldest, operations had been unsuccessfully performed by an eminent oculist in London, who declined making any attempt on the youngest, Miss Grace Russell, aged seven years. September 15, I operated on both her eyes. In the right there was an opaque and thickened capsule, containing a small portion of lens. In the left, the cataract was in a fluid state, and the capsule opaque. I cut in pieces the cataract in the right eye, and projected the greater part of it into the anterior chamber. The needle was as freely passed through both portions of the capsule of the fluid lens in the left eye. The escape and consequent admixture of the milky fluid rendered the aqueous humour completely turbid, and it did not again become clear in less than three days. A slight inflammation succeeded the operation in this eye. In the evening six ounces of blood were taken from the arm, and next morning four leeches applied to the eye-lids, which, with emollient applications and aperient medicines, removed all inflammatory symptoms in four days. The pupil remained enlarged and fixed, as I have often observed after the operation for fluid cataract. In the right eye there was not the least inflammation; the sixth day the whole of the cataract had become absorbed, and the pupil was of its natural appearance. October 10, little change having taken place in the capsule of the left eye, I repeated the operation, detached the capsule from the ciliary processes, and afterwards depressed the whole of it below the edge of the pupil, excepting a very small portion towards the outer margin of the iris. This portion, however, shrunk up, and could not be discerned, when the pupil had regained its proper size: this was in four or five weeks, at which period it also possessed its natural sensibility to light, and was perfectly circular. The vinum opii had been applied thrice a day, which seemed to assist in restoring the natural functions of the pupil. The rolling motion in this patient's eyes was so great previous to the operation, that she had not the power of fixing them for a single instant; she also had a considerable degree of strabismus in one eye, as frequently occurs in persons who labour under congenital cataract. After the operation it was also extremely difficult to prevail on her to keep her attention fixed on any one object: yet, notwithstanding these obstacles to the acquisition of vision, she had learned the alphabet in large-sized characters at the end of a month after she had been allowed to use her eyes; and when I saw her in Glasgow, November 1811, on my return from Ireland, I found her eyes much more steady, and her sight considerably improved, though probably not in so great a degree, as had the eyes been more constantly exercised.

CASE XX.

Miss Catherine Russell, ætat. 13, had capsular cataracts in both eyes when she was brought to me, the fluid lens having been previously removed by an operation with the needle. The pupil of the right eye was fixed and much dilated; that of the left was of the natural size, and indicated considerable sensibility to light. She could discern light, and colours with both, and her eyes were not so unsteady as her sister's. All these circumstances led me to hope a favourable result from the operation. The beginning of October, I operated on the left eye, and perfectly cleared the pupil by detaching the capsule, which was very much thickened, in part from the ciliary processes, and afterwards depressing it.—November 6th, the operation was performed on the right eye, in which I was enabled to break in pieces the capsule; some of these pieces I pushed below the axis of vision. There was no subsequent inflammation in either eye, and the pupils in both were as entirely cleared from the disease as could be wished; yet very little improvement in vision succeeded, although the case had promised so favourably.

CASE XXI.

Miss Russell, nineteen years old, had also capsular cataracts, resulting from an operation in each eye with the needle, by which the fluid contents had been previously removed. In the right eye I found the capsule of the lens opaque, and much thickened; the pupil was dilated, and the collapsed membrane firmly adherent to the posterior surface of the iris through its whole extent: with this eye she could perceive light, colours, and the motion of objects. In the left eye, although there was a clear aperture in the centre of the capsule, yet as the strongest light made no impression on the retina, I did not attempt any operation on it.

October 9th 1810, I operated on the right eye. I experienced great difficulty in separating the capsule from the posterior surface of the iris, which, however, by gentle and repeated efforts, I at length accomplished, with the exception of a very small portion at the upper part. This slight adhesion prevented me from entirely lodging the opaque membrane in the anterior chamber, which it was my intention to have done, not being then so fully aware as I am at present, of the insolubility of the capsule when undivided. The iris having been much irritated during the disengagement of the capsule, some pain and redness ensued, which were removed by once bleeding in the arm, aperient medicines, emollient applications, &c. At the end of a fortnight, as the capsule appeared to have partly receded through the pupil, I resolved to extract it through a puncture in the cornea; an operation I had performed a few weeks before with great success.* The beginning of November, assisted by Mr. J. White of Exeter, after having fixed the eye by introducing Pellier's speculum under the lid, I made a small opening with a cataract knife in the outer side of the cornea, about a line anterior to the sclerotic coat. No sooner, however, had I withdrawn the knife, than by the involuntary action of the muscles of the eye-lids, the speculum was pressed so forcibly against the eye-ball that a considerable protrusion of the iris immediately followed. I instantly removed the speculum, fearing the pupil might become entirely obliterated, as this young lady had not the smallest control over any of the muscles connected with the eye. I next attempted to extract the capsule; but the motion of the eye was so incessant, that it rendered repeated efforts unavailing, and I waited in vain for more than an hour in the hope that I should be able to accomplish this, or to return the protruded portion of the iris through the puncture. Disappointed in both objects, I resolved, if possible, to remove the protrusion, with a pair of curved-pointed scissars. I partly succeeded after repeated trials; but the eye rolled so much as to prevent me from removing it entirely. No inflammation succeeded. In ten days a weak solution of argentum nitratum was dropped into the eye twice a day; and the remaining portion of the prolapsed iris gradually decreased, until it wholly disappeared. Having left Exeter early in December, I did not again see Miss Russell until March 1811. The pupil was then transversely oblong, and extended from its natural situation to the cicatrix in the cornea; the capsule was somewhat wasted, but still occupied a large part of the pupil. On my return from Dublin, November 1811, Miss Russell followed me from Glasgow to Edinburgh, where, assisted by my friend

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* See Case 35.

Mr. G. Bell, I depressed the remaining portion of capsule below the axis of vision, and left the pupil quite clear. A morbid sensibility to light remained for a few days; but it subsided by the application of a refrigerent lotion. Mr. Bell has since informed me, that she returned home in a fortnight, from the time of her arrival in Edinburgh; her vision was then much improved, and she was able to distinguish large letters with tolerable correctness.*

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* The other sister had entirely lost one eye in an unsuccessful operation of couching by a surgeon of Glasgow. The cataract in the other eye had been extracted in London; but a considerable protrusion of the iris ensued, and the pupil was much lessened in size: when I saw her, it was still sufficiently large to admit the passage of light; yet as she was unable to discern objects, I did not judge it expedient to perform any operation. There was a fifth daughter in this family also born with cataracts, who died while an infant.

CASE XXII.

Master P. only son of Captain P. of Calloden in Ireland, and two of his younger sisters, were born with cataracts; the disease was first observed in the boy, a month after his birth. When seven years old, his father brought him to London, with the intention of having an operation performed, and with this view consulted the most eminent oculists in the metropolis. The opinions given, however, were, that no operation could be undertaken with any prospect of success till he should be of an age to understand the necessity of keeping his eyes steady. With these opinions Captain P. was satisfied, and returned home. In the early part of 1811, he wrote to me requesting that I would come to Ireland, to operate on his three blind children, if I thought his two youngest daughters were old enough to undergo the necessary operation. From my experience of its success in children of the tenderest ages, I entertained no doubt of a favourable result, and therefore acquiesced in his proposal. On my arrival in Dublin, in May 1811, I found Master P. and his youngest sister laboured under fluid cataracts with opaque capsules. Those of the elder sister were slate-coloured with transparent edges; I operated on all three, June 1st 1811, in the presence of J. Wild, Esq. the intelligent author of Travels in America, &c. An hour after the application of the belladonna, I made a transverse division of the capsule in the manner described, page 138, and afterwards cut it in pieces close to the edge of the pupil. During the latter part of the operation I was unable to see the point of the instrument, from the fluid cataract having rendered the aqueous humour turbid. Some pain and redness in the eyes succeeded, which were in a few days removed by general and topical bloodletting, aperients, &c. In less than a week the absorption of the milky fluid was completed, when the pupil of the right eye was perfectly clear and circular, and but a very small portion of capsule was visible in the left. Both pupils remained for some time fixed and considerably dilated, but they again recovered their natural size and functions. This is the young gentleman who, as already mentioned, has been placed in London under the tuition of an able master, Mr. Robinson of Lincoln's-Inn Fields.

CASE XXIII.

Miss M. P. aged thirteen, was observed, when an infant, to labour under an imperfection of sight; but it was not until she attained her fifth year that her family suspected any positive disease to exist in her eyes; and they were not even then certain she had cataracts, as the pupils appeared very unlike those of her brother and youngest sister, and her vision was so much better than theirs. On examining her eyes I discovered she had slate-coloured cataracts with transparent edges; through these the rays of light passed sufficiently to enable her to read small print in a moderate light. I operated on this young lady with the two-edged needle, and, according to my usual plan, cut the cataract into small pieces, and placed as many of these as I could in the anterior chamber. During the first fortnight no unfavourable symptom occurred; but at the expiration of that period, without any assignable cause, acute inflammation came on, accompanied with pain and intolerance of light. Notwithstanding a strict adherence to a cooling and antiphlogistic plan, this continued for some weeks, when I changed the mode of treatment and recommended the employment of cinchona thrice a day, with a generous diet, sea air, and sea bathing. This alteration of practice produced an almost immediate amendment, which continued to increase until the inflammation wholly subsided, when I found the pupil of the left eye entirely free from cataract, and the other nearly so. In ten weeks she was able to distinguish the most minute objects, by candle-light, which before the operation she was totally unable to do. The pupil of the right eye was perfectly circular, that of the left a little oblong; her vision is now as good as it ever can be after the removal of the crystalline humour, and is in no respect inferior to that which results from the operation on persons whose cataracts were not of the congenital kind.

CASE XXIV.

Miss Francis Elizabeth P.—, seven years old, laboured under fluid congenital cataracts with opaque capsules; she underwent the operation on the same day as her brother and sister. With one stroke of the needle I made a large aperture through both the anterior and posterior portions of the capsules; their fluid contents consequently became extravasated, and mixed with the aqueous humour. In a week it was absorbed, and no vestige of the disease remained, excepting a very minute portion of the opaque capsule around the margin of each pupil; a slight inflammation ensued, which was removed by the application of a few leeches, aperients, and emollient applications. For several weeks the pupils remained dilated and immovable. Although the aperture in each capsule was of a large size, yet as I was desirous of detaching as much of them as possible from the ciliary processes, I prevailed upon the parents of this young lady to allow me to repeat the operation, which I did the beginning of August; when I happily succeeded in removing the remainder of the opaque capsules. There was no consequent inflammation; and in September, when the patient left Dublin, she had learnt the alphabet, and, by a degree of assiduity unusual in children of her age, was enabled to direct her eyes with much more precision than her brother. It is somewhat remarkable, that after her eyes had recovered from the effects of the operation, she pointed out objects more accurately than he could, although previously his perception of light and colours had been much more distinct than hers.

CASE XXV.

Francis Saxy, of Beer-regis, Dorset, aged 18, applied to me at Exeter, in the summer of 1810. His mother stated, that he was born with cataracts, that she had taken him to London, six years before, when an operation had been unsuccessfully performed on his left eye, by an eminent oculist, who had refused to make any farther attempt on it, or to do any thing to the other. On examination, I found the capsule in the left eye opaque, much thickened, and destitute of the lens. In this eye, the vision was confined to a mere perception of light and colours; but with the other, in which a small part of the lens remained within the capsule, he could see to walk without assistance. The 21st of June 1810, I detached in the usual manner the thickened capsule in the left eye, and depressed it below the axis of vision without difficulty; but in the right, some time and much trouble were required, in order to divide the thickened capsule sufficiently to allow the escape of the pieces of cataract: these as well as the opaque capsule I at length succeeded in placing in the anterior chamber. Much pain had been occasioned by the difficulty attending the separation of the capsule, and in the afternoon considerable inflammation came on. Venæsection was performed, but no blood was lost, as the patient fainted during the operation. Six leeches were therefore applied, which abstracted a considerable quantity of blood, and relieved him from all pain; but the redness of the eye and intolerance of light continuing, the third day I ordered four more leeches, and a blister to the temple. By these means, together with the use of aperients and emollient applications, every dangerous symptom disappeared in four or five days. A week after the operation, all bandages were left off, the pupil was perfectly clear, and he could see distinctly. The pieces of cataract were also absorbed; but scarcely any change had taken place in the capsule. In little more than three weeks after the operation, by the application of the vinum opii three times a day, and the occasional employment of a collyrium composed of the sulphate of zinc, all weakness and irritation having been completely subdued, I allowed him to return home. Previous to his departure from Exeter the capsule in the right eye had considerably contracted, and left four-fifths of the upper part of the pupil clear; which enabled him to distinguish, and point out with a probe, the smallest letters. Eighteen months after these operations I learnt that the capsule had not entirely disappeared, but was so much diminished in size that it no longer obscured any part of the pupil.

CASE XXVI.

William Saxy, twenty years old, brother to the former patient, had also congenital cataracts, which I found to consist of opaque and thickened capsules containing some portions of lens. With the right eye he could merely discern light and colours. With the left, he distinguished large letters if held within two inches of the eye, and with his face being turned from the light; but the sphere of vision was so limited, that he could take in but three or four at a time, and even that power was wholly lost when the eye was exposed to a strong light.

The oculist, when he operated on his brother in London, informed this young man that it would be hazarding the little vision he enjoyed, were he to attempt to perform any operation, and advised him to remain contented. I operated on both eyes the 21st of June 1810. After cutting in pieces the capsule and unabsorbed lens in the left eye with the two-edged needle, I pushed as many of the fragments as possible into the anterior chamber. In the right eye, the capsule from its greater toughnesss could not be so easily separated. However, I succeeded at length in accomplishing this, and placing the whole of the nucleus in the anterior chamber; but the capsule still occupied the greater part of the pupil. Being attacked immediately on his return to his lodging with pain and increased heat in this eye, he was bled, but fainted after losing about six ounces. The pain and heat however abated, and he passed a comfortable night. The symptoms of inflammation having increased, the next day I ordered six leeches, and emollient applications to the eye, besides a blister to the temple. Aperient medicines were also administered almost daily. By these means and the occasional application of leeches, every symptom of inflammation was overcome in the course of three weeks.

In the left eye no inflammation followed the operation; and so rapid was the solution of the cataract, that in a month it was entirely absorbed, leaving the pupil perfectly circular and sensible to light. The fragments of cataract which had fallen into the anterior chamber of the right eye were now also absorbed; but the capsule seemed undiminished, and still occupied the whole extent of the pupil.

August 10th, I repeated the operation, and found the capsule very firmly adherent to the iris; this appeared occasioned by coagulable lymph, effused during the inflammation, which rendered it very difficult to detach. Having effected the separation, I placed a part below the pupil, and the remainder on one side, behind the iris. No inflammation of any consequence ensued. For a few days the eye could not bear the light, and the cornea was rather dull; but by the employment of the vinum opii, and a zinc lotion, for a fortnight, this eye became as free from inflammation as the other. The pupil is perfectly circular except at one point, and he can see equally well with both eyes to read the smallest print without the assistance of spectacles, and in no respect is their vision different. His cure was completed in nine weeks, and he has since lived with me in the station of a footman. At first he was an imperfect judge of distances, but in this respect he has become much improved, though he still finds some difficulty in snuffing a candle, or pouring liquids into a small glass.

CASE XXVII.

Mr. Purkis, aged 30, organist of St. Clement's, Strand, became my patient in the spring of 1810. He laboured under congenital cataracts consisting of opaque capsules inordinately thickened, which contained some portions of unabsorbed lens, and was of that species termed *Elastic cataract*. Both pupils were very sensible to light, and he could discern brilliant colours. He informed me, that when a lad, his eyes had been examined by Baron De

Wenzel, who not only declined operating on him at that time, but strongly dissuaded his father from permitting any operation to be performed at any future period. Several eminent oculists, to whom at different periods he subsequently applied, concurred in the opinions given by the Baron. The rolling motion in Mr. Purkis's eyes existed in a much greater degree than in any patient I had ever seen, which rendered him unable for a considerable time after the removal of the cataracts to keep his eyes steadily fixed on any particular object. The beginning of June 1810, I operated on the right eye, at his father's house in Chancery-lane, in the presence of Mr. Ware and several other professional gentlemen, at which period I had not discontinued the use of the one-edged needle, and therefore used it on this occasion. I found the capsule infinitely harder and more dense than any I had ever met with, requiring the instrument to be kept several minutes in the eye, before I could make an aperture sufficiently large to admit the escape of the fragments of the nucleus. This I at length accomplished, and placed the whole of them in the anterior chamber. During my attempts to divide the capsule, if I made a considerable pressure with the needle downwards, the opaque body would entirely disappear below the pupil; but no sooner was the pressure withdrawn, than it instantly resumed its place, as if touched by a spring. Some inflammation ensued in the afternoon, which was entirely removed by twice bleeding in the arm. As I was obliged to leave London three days after the operation, I did not see Mr. P. till the September following, when he came to me at Exeter, for the purpose of undergoing an operation in the left eye. The upper part of the pupil of the right eye was by this time perfectly clear, and the portions of cataract which had been placed in the anterior chamber were entirely gone, but the condensed capsule still remained, and occupied the lower part of the pupil.

A few days after his arrival, I operated on both eyes. I placed the whole of the remaining capsule of the right eye, in the anterior chamber, which left the pupil clear. In dividing the thickened capsule in the left eye, I experienced much less difficulty than in the first operation on the other, as I now used my two-edged needle; and I afterwards placed the pieces of cataract contained in the capsule in the anterior chamber. There was no subsequent inflammation in either eye, and on the fifth day the redness had entirely disappeared, unless where the instrument entered; but I had the mortification to find the capsule in the right eye had resumed its former station behind the iris, and floated in the vitreous humour immediately posterior to the pupil. In less than a month all the fragments of the lens which were placed in the anterior chamber of the left eye, having been absorbed, I repeated the operation, and separated the capsule into several portions; some of these I carried forward through the pupil, and the rest I pushed below its edge. I also a second time placed the undivided capsule of the right eye in the anterior chamber; but the next morning it had returned through the pupil, and become spontaneously so much sunk in the vitreous humour, that only a very small part of it was discernible. I suffered it to remain, as, from the incessant and rapid motion of the eye, it would have been impossible to extract it without the assistance of a speculum, which it would have been dangerous to use. No inflammation succeeded in either eye: five days after the operation he was sufficiently well to perform on several instruments at a public concert made for him at Exeter, and in as many more he returned to London.*

CASE XXVIII.

In the spring of 1811, I operated in London on a young lady about nine years old, affected with capsular cataracts. The cataracts were originally fluid; but having been twice operated on previous to my seeing her, nothing remained but the capsules, which were very opaque and much thickened. An aperture the size of a large pin's head had been made in each capsule a little on one side of the central points; but as the pupils were unusually large, scarcely a fourth part of them were cleared. In the presence of Mr. Ring, surgeon, of South Molton-Street, with my curved-pointed needle, I separated the capsule of the left eye from its ciliary connexion, except towards the outer angle of the eye, by carrying the instrument in the arc of a circle from the internal to the external canthus, and placed it out of sight when the pupil was under the influence of the belladonna. In the right eye I left the connexion with the ciliary zone in the lower part, and completely detached the rest of the capsule, which I pushed below the axis of the pupil. It however partly rose again; but having frequently seen the diminutive size to which the opaque capsule contracts, after being so much detached from the ciliary processes, I did not attempt to cut it in pieces for the purpose of placing it in the anterior chamber. The third morning after the operation the pupil of the left eye had recovered its natural size; it was clear, circular, and sensible to light, and not the smallest part of the capsule was visible. In the right eye, the capsule had already begun to contract; and as I was obliged to leave London, I left the young lady in the charge of my nephew Mr. Hockin; who has since informed me, that in less than a month the capsule had, as I expected, shrunk into a very small compass, and was situated so much below the lower margin of the pupil, as to be visible only when the pupil was in a state of dilatation. I have not seen this young lady since my return to London, but am informed both pupils are now equally clear; from which I infer, that the capsule in the left eye is either entirely absorbed, or so much contracted as not to be discernible.

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* The professional avocations of this patient and the rolling motion of his eyes, have hitherto prevented him from reaping all the benefit to be derived from the operation. The rolling of the eyes, however, is very much corrected, and he has acquired the power of fixing them at pleasure. He has learnt to read musical characters, to tell the hour with the greatest accuracy on a watch-dial, or by a church clock at a considerable distance, and his power of vision continues to improve. Since his return from Exeter, he walks without a guide by day and night, which he never ventured to do before the operation, and has now entirely laid aside the use of spectacles, except to view minute objects.

CASE XXIX.

Early in December 1811, I was consulted by Mr. Benton of Islington, aged eighty, who in the year 1807 had undergone the operation of extraction for cataract, in both eyes. In the left eye the operation totally failed, almost the whole of the iris having protruded through the section of the cornea, and formed a tumour of a conical shape, which extended considerably beyond the edges of the lids, and prevented their becoming at any time closed. He suffered very acute pain in this eye for several months after the operation, and for three years it proved a continual source of irritation and uneasiness, which had not entirely ceased when he first consulted me. In the right eye there appeared to have been an escape of the vitreous humour, which had dragged a large portion of the iris through the section of the cornea; the lower part of which was rendered opaque, by the inflammation that succeeded the operation. About two-thirds of the upper part of the pupil still remained, but the rays of light were prevented from passing through it, by the capsule, which had become opaque, and firmly adherent to the posterior part of the iris, thereby preventing the contraction and dilatation of the pupil. For the first twelve months after the removal of the cataract, he had been able, though with considerable difficulty, to read common-sized print; but from that period his vision gradually decreased until he applied to me, when he could scarcely see to avoid the furniture of his room.

December 18th 1811, I operated on the right eye in presence of Mr. Hole, of Highbury-Terrace, Islington, the family surgeon. The capsule was extremely tough, and so firmly attached to the posterior part of the iris, and to the cicatrix of the cornea, that it was with difficulty I could separate them. Having however accomplished this, and freely lacerated the capsule, I left the whole of the remaining pupil perfectly clear. The next morning he complained of a slight pain in the eye, and his pulse was somewhat accelerated. Some blood was abstracted from the arm, which immediately stopped all increased action ; and no other unfavourable symptom occurred during his convalescence. On the fifth day from the operation the bandages were removed, and a shade substituted in their stead ; and on the tenth he read small print in my presence, assisted by cataract spectacles. He was not confined to his bed during any part of the treatment; his vision improved progressively; and on the first of January 1812, he assured me that he saw as well as any man, whose eyes had never even suffered from disease, could at his age hope or expect. Topical applications were employed both before and after the operation, to remove the chronic inflammation in the right eye, and the morbid sensibility which still remained in the left, caused by the former unsuccessful operations of extraction; these applications considerably relieved him from the painful sensations with which he had been before so constantly harassed.

CASE XXX.

George Broad, from the parish of St. Guinans, Cornwall, applied to me the middle of June 1810, on account of blindness in both eyes, resulting, as he informed me, from unsuccessful operations of depression for cataracts several months before. Both pupils were contracted to the size of a pin's head, and these small apertures were rendered impervious to the rays of light, by the capsules having become opaque and firmly adherent through their whole extent to the posterior part of the iris, in consequence of violent inflammation which had succeeded the operations. Before they were performed, he had seen sufficiently well to pursue his usual employments as a labourer, but when I saw him he could only distinguish light from darkness. I operated on both eyes in the manner already described with the curved needle. On separating the adherent capsules from the iris, and pushing them below the axis of vision, the pupils instantly became enlarged, clear and circular, possessing their full and free powers of expansion and contraction. No appearance of inflammation followed, and he was sent home a fortnight after I operated on him, with as good sight as patients ever enjoy after the removal of the crystalline lens.

CASE XXXI.

Master R. son of — R—, Esq. Ardee-House, Ireland, became my patient at Bath, May 1810. He had lost one eye during childhood from small-pox, and when he consulted me had cataract in the other, occasioned by a blow received from the bough of a tree about six months before. He could distinguish large objects; but the pupil was much contracted from adhesions of the capsule and iris, and had in a considerable degree lost the power of dilatation. As this young gentleman's vision, though very imperfect, was still useful, his father proposed, before I performed an operation, that Mr. Ware should be consulted, to ascertain his opinion whether under all the difficulties of the case it would be advisable to attempt any. Mr. Ware with great candour acknowledged it was a case in which extraction was wholly inapplicable, and recommended the operation I had previously proposed.

May 1810, I accordingly separated the opaque capsule from the iris, the lens being nearly wasted; but the patient becoming restless, I did not succeed in placing it in the anterior chamber. No inflammation ensued. About a month afterwards I repeated the operation, when I carried the whole of the undivided opaque body forward through the pupil; finding it so tough and hard that it was not possible to cut it in pieces. As no appearance of inflammation followed, I allowed the patient to quit Bath, and assured him that in time the capsule, with its contents, would dissolve and be absorbed. Twelve months afterwards, when in Dublin, I again saw my young friend, and was much surprised to perceive, that though the small remaining part of the cataract was entirely dissolved, yet a large portion of capsule still remained immediately before the pupil, adherent to the internal surface of the cornea, which prevented it from sinking below the axis of vision. My proposal of detaching the capsule from this adhesion being assented to, I introduced the two-edged needle through the cornea anterior to the iris, and with some difficulty accomplished my object, when the capsule instantly sunk to the bottom of the eye, and left the pupil entirely clear except at its upper margin, where there remained a very small portion of capsule, (which had never been separated from the iris), and which was not larger than the head of the smallest sized pin. A slight degree of redness in the eye succeeded, but was speedily removed by the application of leeches, and a cold wash constantly kept to the eye-lids. The portion of capsule which had been detached by the last operation floated in the anterior chamber as the position of the head varied. When the patient bent his head forward, it rose up before the pupil, and consequently for the time obscured his vision, but on resuming an erect posture he could see distinctly the minutest objects, when assisted by a proper glass. I had it in contemplation to extract it through a small puncture of the cornea, but as this could not be done without making use of the speculum, I gave up the idea, hoping, from the diminution in size it had already undergone, that it would soon entirely disappear. Having however heard, since I left Ireland, that it had excited some inflammation by mechanically irritating the iris, I wrote to the young gentleman's mother, to ascertain its present state, who informed me, there certainly had been some inflammation since I saw him, but it had now entirely subsided; that the capsule was much reduced in size, and her son was prosecuting his studies with great industry and success.

CASE XXXII.

Robert H. Esq. 16, Great Cumberland-Street, Portman-Square, aged 26, had a solid light-coloured cataract in his left eye, which had been observed more than fifteen years before. In the right eye the capsule was partially opaque throughout its anterior surface, but he could read pretty distinctly by the assistance of a deep convex glass, when the pupil was not much contracted by a strong light. At an early age he was taken to an oculist of eminence, who declined operating on his right eye altogether, but agreed to extract the cataract in the left if the friends of the patient wished him to do so, though he would not recommend the operation. The young gentleman was therefore suffered to remain in the state I have described until April 1811, when being in London I operated on his left eye in the presence of that respectable surgeon Mr. Adair Hawkins, of Great Marlborough-Street, and some other professional gentlemen. I used my two-edged needle in the usual manner, cut every part of the opaque lens and its capsule into pieces, and placed most of them in the anterior chamber, which was nearly filled with the fragments. About a sixth of the upper part of the pupil was cleared, and he read in five days with this eye, assisted by a proper glass. No inflammation ensuing, I allowed him to come into the drawing-room a week after the operation. Having left London soon after, I know not how long it was before the cataract completely disappeared, as his friends did not accurately mark the period; but on my return from Ireland in November following, no vestige of the disease remained; the pupil was perfectly circular, and possessed its natural functions. Early in December, the operation was performed in the right eye, in the presence of Doctor Ross of Edinburgh. The opacity, as I expected, was confined to the capsule, the lens being firm, and perfectly transparent. After dividing both the capsule and lens in halves, I cut them into several pieces; all these I lodged in the anterior chamber. No inflammation or pain in the eye ensued; but in the evening the family surgeon, to whom I had given a discretionary power respecting bleeding, finding the pulse somewhat accelerated, very judiciously took off six ounces of blood, which reduced them to the natural standard. At the end of a fortnight a small carbuncle formed on his cheek, and excited considerable inflammation in the surrounding integuments, which was communicated to the eye-ball itself. This however ceased, as soon as the carbuncle was cured. Five weeks after the operation, the lens had wholly dissolved, and in a moderate light the pupil was completely transparent; but when much dilated, some of the circumference of the capsule was still visible in its upper and lower part, which has since disappeared. The pupil in this eye in every respect looks as well as the other, and his vision in both is as good as it ever can be after the removal of cataracts.

CASE XXXIII.

Mr. John Scoles, aged eighteen, 210, High Holborn, at seven years of age was sent to school; where being found incapable of seeing distinctly, he was taken to an eminent oculist, who thought his imperfect vision arose from near sight, and advised country air and tonic medicines; although his health improved under this regimen, his sight was not benefited. When thirteen years old, he was taken to another oculist, who immediately pronounced the case to be cataract, and the operation of extraction on the left eye was shortly afterwards performed. The cataract was extracted; but an almost entire closure of the pupil ensued, for which he underwent three unsuccessful operations. In April 1811, I was consulted, and found in the right eye a slate-coloured cataract with a transparent edge. With this eye he could explore his way when the light was not vivid. The pupil of the left eye was obliterated, unless just at its upper margin; behind this small aperture there was an opaque capsule, which prevented any other perception than that of light and colours.

April 7th 1811, I performed the operation for cataract on the right eye, and cut the capsule and cataract in pieces very freely, placing as much of the latter as I could into the anterior chamber. A slight inflammation succeeded, which was removed by once bleeding in the arm, emollient applications, &c. By applying the extract of belladonna in its concentrated state to this eye rather too soon, some redness was re-induced, but it disappeared by the use of cold applications. I left London in a fortnight after the operation, and did not again see my patient till my return in December, when both lens and capsule were entirely removed, and the pupil was perfectly clear, circular, and sensible to light. His friends informed me, the parts of the cataract that had been brought forward, disappeared in five or six weeks after the operation; but the remainder, which was left behind the iris, was not entirely absorbed under five months. He had learnt to read print of a small size a month after he was fitted with spectacles, and is now capable of seeing both near and distant objects with precision. Encouraged by the benefit received in this eye, the young man's father requested I would operate for artificial pupil in the other. This I attempted, the end of December 1811; but, the vitreous humour being entirely disorganized, I was prevented from making the division in the iris as large as I wished; so much of that humour escaped by the side of the instrument, as to render the coats of the eye quite flaccid, and the small aperture I did make became closed. From the repeated operations performed in this eye previous to my seeing it, the organ was in so irritable a state that it did not perfectly recover its tone for some months, although no inflammation of any consequence succeeded. The patient and his friends are now so well satisfied with the vision he enjoys, that they do not wish for any farther operation.

CASE XXXIV.

John Croker, of St. Stephen's, near Saltash, aged 40, by trade a carpenter, was recommended as an in-patient of the Exeter Eye-Infirmary, by the Rev. Mr. Buller of Saltash, for the purpose of undergoing the operation for solid cataract in both eyes, which was performed the day after his admission. I used the double-edged needle, and divided the cataract in the right eye in halves. The lower half I placed in the anterior chamber without any farther division, and allowed the other to remain suspended in its natural situation. In the left eye having introduced the needle too close to the iris, I withdrew it without making any attempt to divide the cataract. In the afternoon pain and redness supervened, w h a watering in the right eye, for which I abstracted twenty ounces of blood from the arm, and applied a blister to the nape of the neck. These means, with warm applications, effectually removed all inflammation in four days. At the termination of a week, I again introduced the needle into the left eye, and attempted to open the capsule by a perpendicular movement of the instrument; but finding that I had detached the lens from the ciliary processes, I withdrew its point, then carried it forward through the anterior chamber, and turning its edge backwards I cut the lens in several pieces; when, to my surprise, the fragments sunk in the vitreous humour so entirely out of the axis of vision, that the man could see minute objects immediately after the operation. No inflammation followed, and he was discharged a fortnight after his admission, able to read the smallest print with his left eye, the pupil of which was perfectly circular, clear, and readily adapting itself to different degrees of light. The half of the lens placed in the anterior chamber of the right eye was not much wasted, but it had assumed a flocculent appearance. I have since been informed, that in less than two months after his return home, he could see as well with this eye as with the other.*

XXXV.

Jacob Phelps, a young man of Totness, Devon, was admitted an in-patient of the West-of-England Eye Infirmary, for congenital cataracts, July 25th, 1810. In the right eye he had a slate-coloured cataract with a transparent edge, which admitted sufficient light to afford him useful vision; in the left, the cataract consisted of an opaque capsule, and a small portion of unabsorbed lens: with this eye he could merely distinguish light and colours. July 26th, I operated on both eyes with the two-edged needle. In the right eye I separated the capsule and lens very freely, and brought as many of the fragments as I could, forward into the anterior chamber. In the left eye the cataract was also freely divided, and lodged in the anterior chamber; the anterior part of the capsule, which could not be divided, remaining behind the iris. No inflammation succeeded the operations. In three weeks the divided cataract in the left eye had entirely disappeared, but the anterior part of the capsule still remained undissolved, floating in the vitreous humour immediately behind the pupil. In five weeks the fragments of cataract in the right eye, which had been brought forward, had become absorbed; but those which remained behind the iris were undiminished. I then repeated the operation on both eyes, brought forward the greater part of the softened lens of the right eye into the anterior chamber, and placed the capsule in the same situation in the left. This in a few days again returned through the pupil; three times successively the same circumstance occurred; on a fourth attempt it returned as soon as the needle was withdrawn from the eye. I therefore determined to make a small puncture through the cornea and extract it,* which I accomplished without difficulty, with a two-edged scalpel and a curved needle. In three days the puncture had healed sufficiently to admit of the eye being left uncovered, when it had assumed the natural appearance, the pupil being perfectly circular, transparent, and sensible to light. But the retina, from want of exercise, was not so sensible to its natural stimulus, as the free power of contraction and dilatation in the pupil previous to the operation had led me to expect. The cataract in the right eye was not dissolved in less than twelve weeks; when, with the assistance of proper glasses, he was able to see with it, as well as if no disease had previously existed. The length of time necessary for the solution of a slate-coloured cataract was particularly marked in this case; for though it was cut into very small pieces, the greater part of which at the two operations were brought into the anterior chamber, yet it was nearly three months in dissolving, while the cataract in the other eye disappeared in three weeks, a part of the opaque capsule alone then remaining.

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* A short time subsequent to this operation, I operated on a gentleman, 80 years of age, in one of whose eyes the vitreous humour was similarly disorganized. As soon as I had divided the cataract the fragments immediately disappeared, and the patient could read the smallest print in a day or two, which was as soon as the organ could bear the light. In both these instances, as the natural size and hardness of the eye were preserved, I had no reason, previous to the operations, to suppose the vitreous humour had undergone this morbid change.

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* At that time I was not aware that Mr. Gibson was in the habit of practising this operation, as his Treatise on Artificial Pupil, &c. did not appear until nearly six months afterwards.

CASE XXXVI.

John Taylor, of Farringdon, near Exeter, aged 72, was admitted an in-patient of the West-of-England Eye Infirmary, March 6th, 1809. He had large and solid cataracts. In the left eye, I placed the undivided lens in the anterior chamber, which was unusually large. I was induced to make this trial of an undivided lens, from a circumstance that occurred a short time before in the Infirmary. A solid lens had accidentally slipped through the pupil of a patient without division, which at the period of Taylor's application was considerably lessened in size, and had not then occasioned either pain or inflammation. In the right eye, however, I cut the whole of the lens in pieces, and lodged it thus divided in the anterior chamber. No inflammation followed the operation in either eye. In six weeks so many of the fragments in the right were absorbed, that the upper part of the pupil was sufficiently clear for the patient to read print of a moderate size, with the aid of convex glasses. The opaque lens in the left eye was also considerably diminished. In less than ten weeks the pieces of cataract in the right eye being entirely absorbed, and the left eye perfectly free from pain and inflammation, he was allowed to return home. At the end of a month this man's daughter informed me, that her father's eye, in which the nucleus still remained, was become much inflamed and exceedingly painful. I expressed a wish that he should return to the Infirmary, which being complied with, I found the cataract so much lessened, as to leave one quarter of the upper part of the pupil clear. The mechanical friction of the lenticular nucleus against the iris, had, however, excited a great degree of inflammation accompanied by excessive pain, not only in the eye itself, but also in the side of the head and cheek. The temporal artery was opened, leeches, blisters, sedative applications, &c. were by turns applied, but nothing appeared to afford him so much relief as remaining quiet in bed. In a fortnight or three weeks all pain and irritation having subsided, he was discharged from the Infirmary; but as soon as he began to use exercise, the painful symptoms again recurred, which were relieved as before, by the patient keeping constantly in bed. It was more than five months from the operation before the nucleus was entirely absorbed; since which, however, he has been free from uneasiness, and sees equally well with both eyes.

CASE XXXVII.

Mr. V——, a surgeon, of Birmingham, about 60 years of age, applied to me at Bath, to perform an operation for cataract in his right eye. I found he laboured under that large and dark-coloured species which, as I previously told him, would require a considerable length of time to dissolve.

About the middle of January, 1811, in presence of his son, who is also a surgeon, I cut up as much of the anterior part of the cataract as was practicable, and placed the fragments in the anterior chamber. Some inflammation followed, which was removed by the usual means. In six weeks the detached pieces being wholly dissolved, I repeated the operation. The remaining portion of cataract was still, however, too large and dense to warrant my attempting to divide it. I, therefore, sliced off as much of its softened anterior surface, as nearly to fill the anterior chamber. There was no subsequent inflammation of consequence, and the patient being extremely anxious to return home, he did so in a fortnight or three weeks. More than one half of the cataract had dissolved, and the remaining portion being freely exposed to the action of the aqueous humour, I entertained the hope that its solution would be ultimately effected without any other operation. I saw my patient at Birmingham three or four months afterwards. There was but little diminution in the size of the solid nucleus, a small part only of the outer edge of the pupil being clear, by which he could perceive large objects obliquely with tolerable accuracy. Much disappointed by the slow progress of his cure, I proposed to cut the remaining nucleus in pieces. To this Mr. V. at first consented; but after the speculum was fixed, and I was in the act of passing the needle through the coats of the eye, he became so agitated, that, notwithstanding every argument and persuasion were made use of by his two sons and myself, he would not submit to any further operation.

Since my return to London his son informed me by letter, that nine months after the first operation the cataract had not entirely dissolved; and his father, ignorant how long I might be detained in Ireland, had therefore gone to London, where it was successfully extracted.

CASE XXXVIII.

Col. B—, a gentleman in advanced age, consulted me in London, April 1811, on account of total blind in the right eye, and very imperfect vision in the left. From the latter a cataract had been extracted some time before. On examination, I found a portion of capsule remaining which had become opaque, and the small aperture made in its centre did not admit the rays of light sufficiently to afford good vision. As the pupil in each eye was exceedingly small, this remaining portion of capsule, which was situated near the lower margin of the pupil, had escaped observation, and the cause of his imperfect vision in this eye was not ascertained previous to my seeing him. In the right eye there was a cataract of a very large size, striated, and of an appearance indicating great solidity. I operated on both eyes the same day. In the left I completely removed the remaining part of the opaque capsule, which enabled the pupil to expand freely; and as no inflammation ensued, the patient, with the aid of a convex glass, read small print with fluency, the second morning after the operation. But previous to my coming to London, having promised to fulfil a professional engagement in Ireland in the month of May, I therefore in the right eye only removed a portion of the anterior capsule, and did not attempt to cut in pieces any part of the opaque lens; expecting that, on my return from Dublin, I should find nothing but the solid nucleus remaining, which could then be easily cut in pieces, and placed in the anterior chamber. Some hours after the operation, inflammation came on in this eye. Blood was abstracted both generally and locally, which, with emollient applications, &c. removed the acute symptoms. I was reluctantly obliged to leave London in three weeks. Some irritation in the eye still remained, but it was by no means of a dangerous kind, as the pupil admitted of being kept in a state of dilatation, by a solution of belladonna. On my departure I left Col. B.— in charge of a professional friend. I heard nothing of my patient until my return from Ireland in December, when he came to London; and I found that the edge of the cataract having first become dissolved, the nucleus had slipped into the anterior chamber, and by its mechanical friction against the iris had for some weeks kept up irritation and uneasiness in the eye, but by no means in so great a degree as I have sometimes witnessed from a similar cause.

I immediately proposed extracting the nucleus through a puncture in the cornea, which was acceded to, and, on the following morning, with a two-edged scalpel I made an opening about two lines in length, a little anterior to the iris. Through this I introduced a small hook, but had no sooner laid hold of the softened nucleus than it broke into several pieces. These I extracted, except about one eighth part, which I left to dissolve, and which in three weeks entirely disappeared. No unpleasant symptom succeeded the operation, and the wound in the cornea soon healed. From the long-continued friction of the cataract against the iris, the eye however remained weak, and morbidly sensible to light. Nothing appeared to relieve this, but the application of a blister to the temple, or behind the ear; or otherwise stimulating these parts with an embrocation composed of antim: tartar: and equal quantities of ol: olivar: and aq: ammon: pur:—Five times successively these applications relieved the eye in a most striking manner; but notwithstanding my urgent remonstrances at their being as often laid aside, I could never prevail on my patient to continue them for more than a week or ten days at a time, though a very few days after they were discontinued the eye uniformly became as much affected as before. All local applications to the eye which were tried, excepting the vinum opii and cold water, seemed to increase irritation: they were, therefore, with this exception, wholly laid aside. In consequence of continued weakness in the eye, I did not venture to try spectacles till the beginning of March, when the patient could read small print fluently if placed immediately before him, but could not see it distinctly when in a lateral direction. The eye having now gained strength, I was for the first time enabled to examine the pupil in a strong light, and observed that the posterior part of the capsule remained, and had become opaque; but there was a small aperture in the centre, which perfectly explained the cause of his imperfect vision. I therefore with the curved-pointed needle removed the whole of the opaque capsule, and left the pupil clear. One or two drops of blood were effused in the anterior chamber during the operation, but were absorbed in a few days, and there was no subsequent inflammation. The pupil is nearly circular, and is considerably larger than when I was first consulted; which I consider a very fortunate circumstance, as the sphere of vision consequently must be much increased.*

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* While I was in Dublin, I operated on this gentleman's brother, who was more than sixty years of age, and laboured under solid cataracts. I sliced off from the anterior portion of the lens in each eye, as much as filled more than half of the anterior chamber with the fragments, which dissolved without his having experienced the smallest degree of inflammation. It was my intention by a second operation to cut the nuclei in pieces; but in four weeks so much of the remaining lens in one eye had become absorbed, that my patient could both read and write, with which he was perfectly satisfied, and declined any further operation.

CASE XXXIX.

April 1810, I was consulted at Bath by Mrs. C—, a lady more than sixty years of age. She had an opaque lens in the right eye, and symptoms of incipient cataract were observable in the left. The cataract in the former was of a light colour and very opaque, the pupil circular, and sensible to light. Her apprehensions of the operation were so great, that she could only be prevailed on to undergo it, after being present when the operation was performed on a gentleman, who assured her the pain was very inconsiderable. The day after this I operated on her in the presence of her son-in-law Mr. E—, Doctor Wilkinson the ingenious author of a Treatise on Galvanism, and several other professional gentlemen. I divided the whole of the cataract and capsule very freely, but suffered them to remain behind the iris. After I had withdrawn both the needle and speculum, the patient inquired when I intended to commence the operation, and would scarcely believe that it had been already executed. The eye was bound up, and she was put to bed. Violent inflammation came on in the course of the afternoon, for which she was repeatedly bled in the arm, the temporal artery opened, and some dozens of leeches successively applied at intervals: notwithstanding these active measures, it was nearly a month before I considered the eye free from danger. The pupil was now considerably contracted and of an irregular form; but in about seven weeks, when the divided portions of the lens had disappeared, the circular form was again restored, and the patient could see the minutest objects with the assistance of a proper glass. As she still possessed useful vision in the left eye, I did not then recommend any operation. At times previous to my seeing Mrs. C—, she had experienced vertigo, head-ache, flushings of the face, &c.; which, with a very hard pulse, strongly indicated a disposition to apoplexy, for which she had lost blood, but not in sufficient quantity. The inflammation that succeeded the operation, may therefore be regarded as a fortunate circumstance, as it led to such active depletion, that I have been informed she has since enjoyed much better health and spirits than she did before, and has remained entirely free from those alarming symptoms.

CASE XL.

Ann Shea, aged 64, applied to me in Dublin, May 1811, and stated she had been blind for five years. She had large and solid cataracts, which appeared striated. June 1st, I operated on both eyes, in the presence of several of the most respectable surgeons in Dublin. With my one-edged knife I cut in pieces, very freely, the anterior portion of the capsule and cataract in each eye, and placed the fragments in the anterior chamber. A slight inflammation ensued, which was quickly removed by once bleeding in the arm, emollient applications, &c. In less than a month all the pieces in the anterior chamber were disolved. The patient then went home, and I did not again see her till the middle of August, when on her return to Dublin I found the remainder of the cataracts were but very little diminished in bulk, but they had assumed a lighter colour. I repeated the operation in the presence of Stewart Bruce, Esq. of Dublin Castle, and with the double-edged needle divided into several parts the nucleus in each eye, all of which I brought forward into the anterior chambers. There was no subsequent inflammation. The absorption of the opaque lenses commenced in a few days, and proceeded so rapidly, that in a fortnight the pupil of the left eye was quite clear, and that of the right nearly so. She could then see to read the smallest print with glasses, and returned home happy and grateful for the benefit obtained.

CASE XLI.

John Herbert, a postillion, Grosvenor Mews, Bond-street, aged 40, applied to me the beginning of December, 1811. He had large and solid cataracts in both eyes; and stated, that in the left he had been blind nearly nine years; that in the right, though his sight had been gradually declining for the last four years, he was able to continue his employment till the preceding summer, when he had been forced to give it up altogether. December 10, 1811, he underwent the operation in both eyes, in the presence of Mr. Sharp, one of the Governors of the London Eye Infirmary. In the left eye I divided the capsule and cataract into three or four parts, and placed the whole in the anterior chamber. A small part of the pupil, which was perfectly clear, could be seen through an aperture left by two of the pieces of the cataract overlapping, which enabled him immediately to distinguish objects. In the right eye I cut the cataract in halves; one of these I placed in the anterior chamber, and suffered the other to remain behind the iris. There was no inflammation in the left eye during the patient's convalescence, but the right was attacked very severely in the evening. Its progress, however, was arrested by twice copiously bleeding him from the arm. Five days after the operation he had recovered sufficiently to come to my house. In the left eye, for the first fortnight, there was little change in the appearance of the cataract; it then assumed a flocculent appearance, and in another week had diminished so much in size, as to leave more than the upper half of the pupil quite clear; when, assisted by cataract spectacles, he could read print of the smallest type. A fortnight afterwards the whole of the opaque lens and its capsule had disappeared, the pupil was clear and circular, and possessed the power of dilatation and contraction, as perfectly as if no disease had previously existed. When the pupil was under the influence of the belladonna, a very small portion of capsule was perceptible at its lower edge; but the patient's vision was so good, I could not prevail on him to allow me to remove it by another operation. In the right eye, the half of the cataract placed in the anterior chamber, dissolved nearly in as short a time as in the other; but the remaining half, situated behind the iris, did not become entirely absorbed in less than fourteen weeks after the operation, and for the first ten he had not the smallest use of the eye. During the latter part of the solution of the half, in the anterior chamber, inflammation came on a second time, but was very slight; it, however, increased to a much more serious degree after the entire disappearance of that part, and seemed to arise from the unequal pressure of the remainder of the lens against the posterior part of the iris. It was repeatedly necessary to apply blisters to the temple and behind the ear, during the last weeks of his convalescence, with emollient applications to the eye, &c. and to give purgatives almost daily. There was manifested a strong disposition to a contraction of the pupil, which, however, was overcome by a solution of the extract of belladonna, frequently applied. After the entire disappearance of the cataract, the cornea, which had been previously partially opaque, was restored to its natural appearance, and the pupil was circular and moveable. A small portion of capsule was still discernible when the pupil was much expanded. But, the patient having returned to his employment as a postillion, no further operation has been thought of, as his vision in this eye is equally as good as in the other. I have been recently informed, that his sight has improved so much, that he has altogether laid aside the use of those glasses which enabled him to see distant objects.

CASE XLII.

In the beginning of March, 1812, I was consulted by Mrs. H——, aged 40, wife to Captain H——, of the 15th Light Dragoons. She laboured under solid cataracts ; but they had not reached so advanced a stage, as to preclude her seeing large objects, &c. Her eyes were naturally prominent, with a large anterior chamber, and had been for some years subject to a chronic inflammation, which rendered them very irritable and sore to the touch. The cataract in the right eye was the most advanced, and was therefore selected for operation. The middle of March, in the presence of Mr. Skirrow, of Gower-Street, I cut in halves the lens and anterior part of the capsule; these I placed, without any further division, in the anterior chamber, as the solidity and large size of the former body prevented my separating it into small portions. The two halves of the cataract so entirely filled the anterior chamber that there appeared no space left for the aqueous humour. No acute inflammation ensued. In a few days, from the continued application of a refrigerent lotion, the patient experienced a rheumatic pain in the cheek and temple, which was also communicated to the eye; but she was relieved by emollients, and the application of four leeches to the corner of the nose and eye-lids. In a fortnight the extremity of the edge of the opaque lens having wasted, the ciliary margin of the iris was perceptible; but in the centre, where the two pieces were kept in close contact, there was little change. In another week its diminution was very visible, and proceeded so rapidly that in little more than five weeks from the operation, the whole of the lens and anterior capsule, which had been also placed in the anterior chamber, were entirely dissolved. The posterior part, however, of the capsule was opaque, and remained in its natural situation. There was an aperture in its centre, which admitted sufficient light to enable the patient to read the smallest print, when placed immediately before the eye, with the assistance of a convex glass; but the extent of vision was very limited. At this period Mrs. H. was unexpectedly called into the country; and on her return to town, I intend removing the remaining portion of capsule; by which her sphere of vision will be considerably increased.

CASE XLIII.

Charles J——n, Esq. of Lancing, Sussex, aged 36, was born deaf, and consequently never acquired the perfect powers of speech. He was placed at an early age under the tuition of the celebrated Abbé de l'Epée at Paris, who taught him a guttural utterance, which was intelligible to those accustomed to be with him. Reading being his only amusement, he was well acquainted with most authors, and his disposition was so placid and contented, he appeared happy without any other resource. At the age of eighteen he was however attacked with a dimness of vision, which progressively increased for five years, when he became incapable of reading, or of discerning any minute objects. Flashes of red and white light now appeared, occasionally changing to dark motes, and black streaks, which almost constantly flitted before his eyes. His mind, naturally active and intelligent, then sunk into despondence, and from a want of sufficient bodily exercise, he in a few years became so plethoric that an apoplectic tendency was strongly manifest. About seven years ago he became very lethargic, the scalp ædematous, and he was attacked occasionally with vertigo. Mr. Ware was consulted, who judiciously ordered setons to the temples, and an issue in the back of the neck, which carried off the increased size of the scalp, but, as I was informed by Mr. J.'s mother, he declined attempting any operation to restore sight, considering the case confirmed gutta serena. From this period all hopes of cure by an operation were given up, until Mr. J—n was brought to me the beginning of April 1812, when

I discovered an opacity deeply seated in the vitreous humour. The pupils possessed their natural sensibility, and he could perceive the outlines of objects. The light had formerly seemed to him of a yellow colour in both eyes, but since the application of a stimulant drop, prescribed by a celebrated empiric some time previous to my seeing him, it had changed to a purple colour in the left. The opacity at the first view appeared as if seated in the retina, but on attentively examining the eyes after the pupils had been dilated by the belladonna, it was evidently in the posterior part of each capsule, the centre of which in both eyes was more diseased than the circumference. The anterior part of the capsules and the lens were perfectly transparent. Although the black spots, flashes of light, &c. proved that the retina was diseased, yet considering it more as a functional than an organic defect arising from a want of due exercise of the organ, I conceived, if the obstacle to the passage of light could be removed, the patient might obtain useful vision. April the 16th, in the left eye (which was by far the most diseased), I divided the anterior capsule and lens into three or four parts, and brought them forward into the anterior chamber, the whole of which they occupied. No acute inflammation succeeded, but some redness continuing in the conjunctiva for some time, though unattended with pain or intolerance of light, I ordered leeches to the eye-lids twice or thrice at intervals of some days. The second or third day after the operation the lens had become opaque ; in ten days, absorption had commenced, and proceeded so rapidly, that in less than a month the whole of the lens and anterior capsule were dissolved. The posterior capsule however remaining, May 25th I removed it by a second operation, and left the pupil perfectly clear and circular. May 27th, the patient could mark the time by a watch, and on the 5th of June, when this case was taken down, he read print of a moderate size without any difficulty, and, assisted by a convex glass of three inches and a half focus, told the hour by a church clock at a considerable distance. He then returned home. June 22d I received a letter from Mrs. J—n, informing me her son "with his spectacles now reads with great facility, and sees every object ; the motes begin to disappear, but he still sees fifteen candles where there are but two, unless he puts on his spectacles, when the number appears as they really are."*

To this letter Mr. J——n himself added a line, expressive of his happiness and gratitude.

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* About two years since I successfully operated for cataract on Mr. Williams, a gentleman concerned in an extensive Brewery at Bath, who for more than twenty years had been blind as was supposed from amaurosis. During this period he several times went to London to obtain the best advice; but as he had symptoms very similar to those under which Mr. J—n laboured when I was first consulted, no operation had been considered advisable. After the removal of the cataract, Mr. W. also saw a great number of candles instead of one; every thing for some time appeared by day of a green colour; and at night the sky seemed as if on fire. These symptoms certainly bespoke that the retina was functionally deranged; they however decreased in proportion as the eye was exercised, until they entirely disappeared, and he now sees as well as any patient on whom I have ever operated for cataract.

POSTSCRIPT.

Observations on some Symptoms generally considered indicative of Amaurosis.

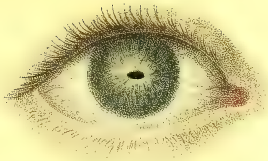
In my general observations on the operations for obliterated pupil, I have remarked that it was sometimes very difficult previously to ascertain the real state of the retina in that disease, as I had often experienced success from the operation when I least expected it, and had been disappointed when the symptoms appeared favourable. The same uncertainty exists in cases of cataract, when uncombined with adhesions between the iris and capsule of the lens. The state of the pupil as to its size and powers of motion, and the appearance of muscæ volitantes, have been generally considered by authors who have written on diseases of the retina, as the principal symptoms for ascertaining its actual state; but experience has convinced me, that the inference, though frequently correct, is not conclusive. In the commencement of my practice, confiding in the exactness of the observations of my predecessors, I was deterred from making any attempt to relieve a patient by an operation under such circumstances; but I have in many instances since succeeded when these symptoms have been present, and on the contrary have sometimes failed, when from the mobility of the pupil I had reason to expect success. I have seen amaurosis exist when the pupils were not only of a natural size, but even evinced considerable mobility when exposed to different degrees of light. In other cases, though the pupil has remained dilated and fixed after the operation for cataract, yet the patients obtained as perfect vision as is ever enjoyed after the removal of the opaque crystalline. There are also instances of a considerable enlargement of the pupil without any attendant injury to vision, and uncombined with any other disease. Where adhesions between the capsule and iris are complete, this morbid state is readily ascertained by the irregular form of the pupil, and its incapability of motion when the eye is exposed to different degrees of light, or after the extract of belladonna has been applied; but if the adhesions are confined to the circumference of the capsule, the circular form of the pupil is preserved, and there is a slight degree of motion perceptible in the pupil; though in both cases the retina is equally sound. It is evident from all these facts, that neither the size of the pupil, nor the functions of the iris, can lead with precision to the state of the retina. But what renders the symptoms of amaurosis still more uncertain is, that the flashes of red and white light, black spots, streaks, flies, &c. floating before the eyes, which have been generally considered diagnostic of amaurosis, are proved not to be so by Case 43. In three or four other instances, where I have recently operated with success, this truth is further confirmed. One of these, is in a gentleman who has laboured under a dark-coloured cataract for the last twelve years. During this period he three times came from Ireland to London for advice, but from the presence of these symptoms, the case was considered, and treated, as amaurosis, and he was not aware that he had a cataract until he consulted me. The same opinions had been entertained in the case of another of my patients; a gentleman residing in London, in whom the opacity was confined to the posterior capsule, as in Case 43, where it had existed for seven years, and the real nature of the disease had not been suspected. I have also within the last month operated for cataract on a fourth patient, who has been blind nearly twenty years, and, labouring under very similar symptoms, was likewise considered as incurable. He is already able to discern minute objects, and as the powers of the retina daily increase, there is every reason to hope for ultimate success. I am therefore persuaded, that the cataract should always be removed, when the patient can discern light from darkness, and the shadow of the hand passed between the light and the eyes. Although I would by no means venture to predict uniform success in such cases, yet the benefit to be obtained is so great, that I think the trial ought to be made; particularly as, from the mildness of the operation, the attendant pain is very trifling, and there is little if any risk of producing deformity.

FINIS.

J. Brettell, Printer, Rupert-Street,
Haymarket, London.

Plate

1



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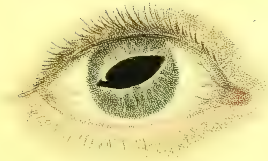


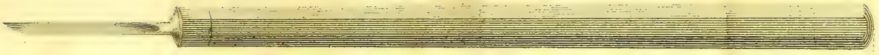
The Pupil in John Mercers right eye previous to the last operation.

2 Represents the subsequent appearance.

Engraved by J.Haw

Published May 28th 1812, by Callow, Crown Court

1



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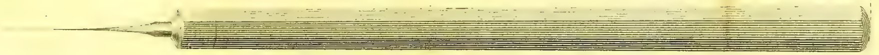

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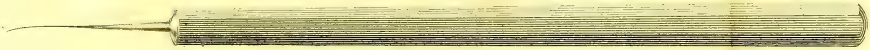

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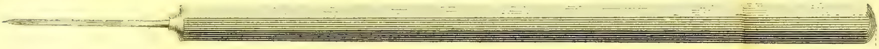

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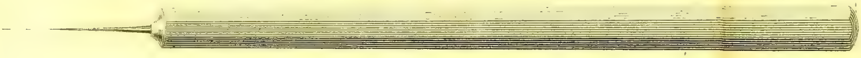

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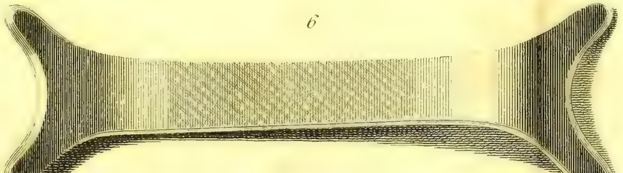

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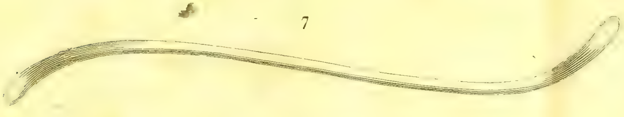

Engraved by J Hawksn

Published May 28th 1812, by Callow, Crown Court.

ERRATA.

Page 18, line 5, *for* to prevent the ligature from ulcerating, *read* to prevent the ligature from causing ulceration.
—— 33, —— 14, *for* it is termed, *read* it may be termed.
—— 35, —— 5, *for* to any other author, *read* to any author.
—— 43, —— 19, *read* could not see *sufficiently* to avoid, &c.
—— 47, —— 22, and page 48, line 1, *for* pursuing this plan first recommended, *read* pursuing the plan just recommended.
—— 54, —— 3, *for* or, *read* nor ; line 19, *for* agglutenates, *read* agglutinates.
—— 58, —— 21, *for* to avoid objects sideways, *read* to avoid objects which presented themselves sideways
—— 60, —— 2 and 3, *for* this complicated state of disease, *read* these complicated states of disease.
—— 61, —— 15, *for* in *read* to.
—— 81, —— 16, *read* perfectly.
—— 113, note line 2, *for* Shelden *read* Sheldon.
—— 120, line 22, *for* curvette, *read* curette
—— 121, —— 1, *for* parts *read* part
—— 160, —— 3, *read* pieces
—— 194, —— 3, *read* I. Weld, Esq.
—— 212, —— 15, *read* St. Guineas, Cornwall.
—— 231, —— 9, *read* blindness.
—— 238, —— 13, *read* dissolved.